PENNSYLVANIA
WILDLIFE ACTION PLAN

2015–2025

Species of Greatest Conservation Need Species Accounts

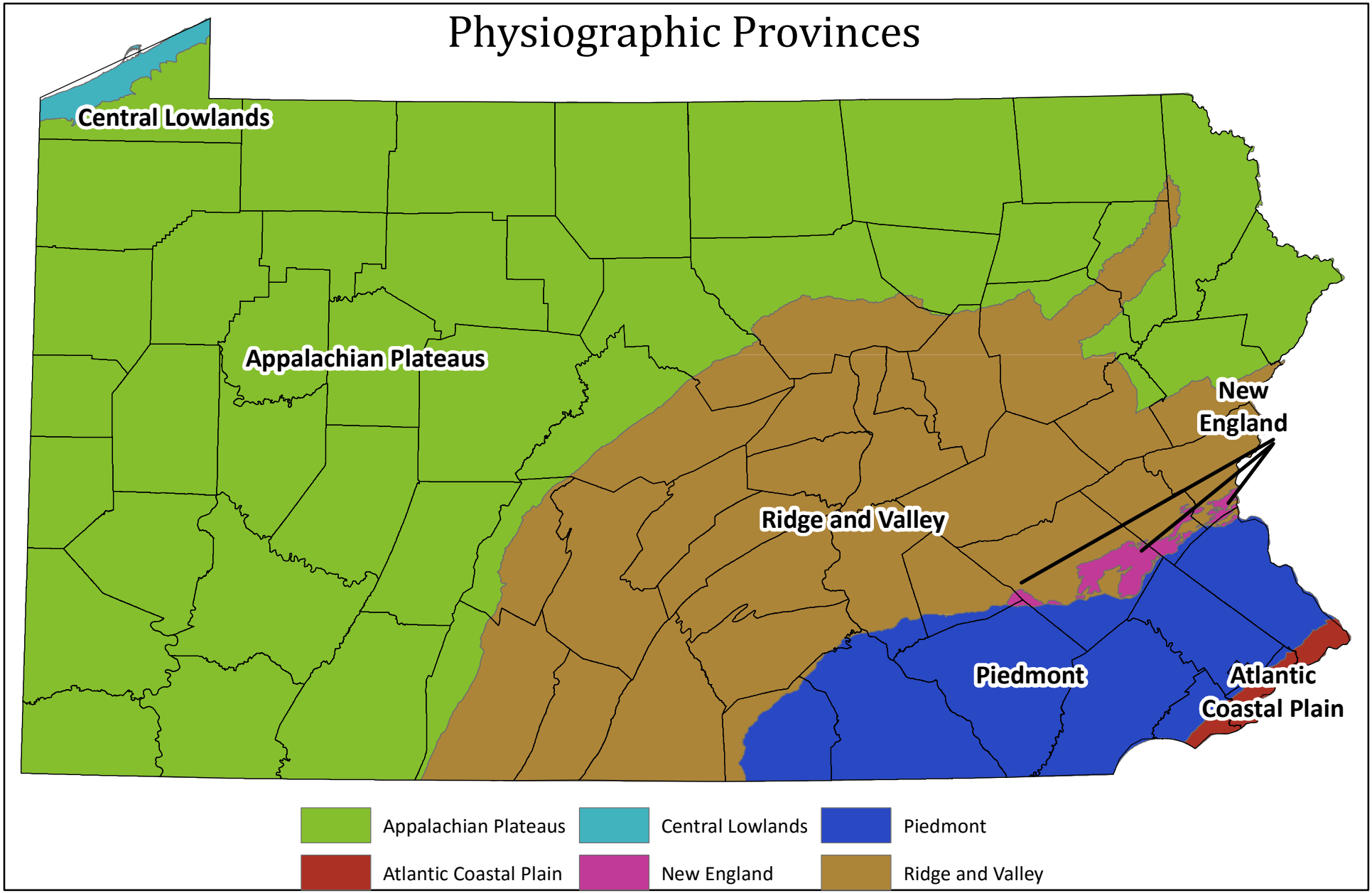
Appendix 1.4D-Reptiles

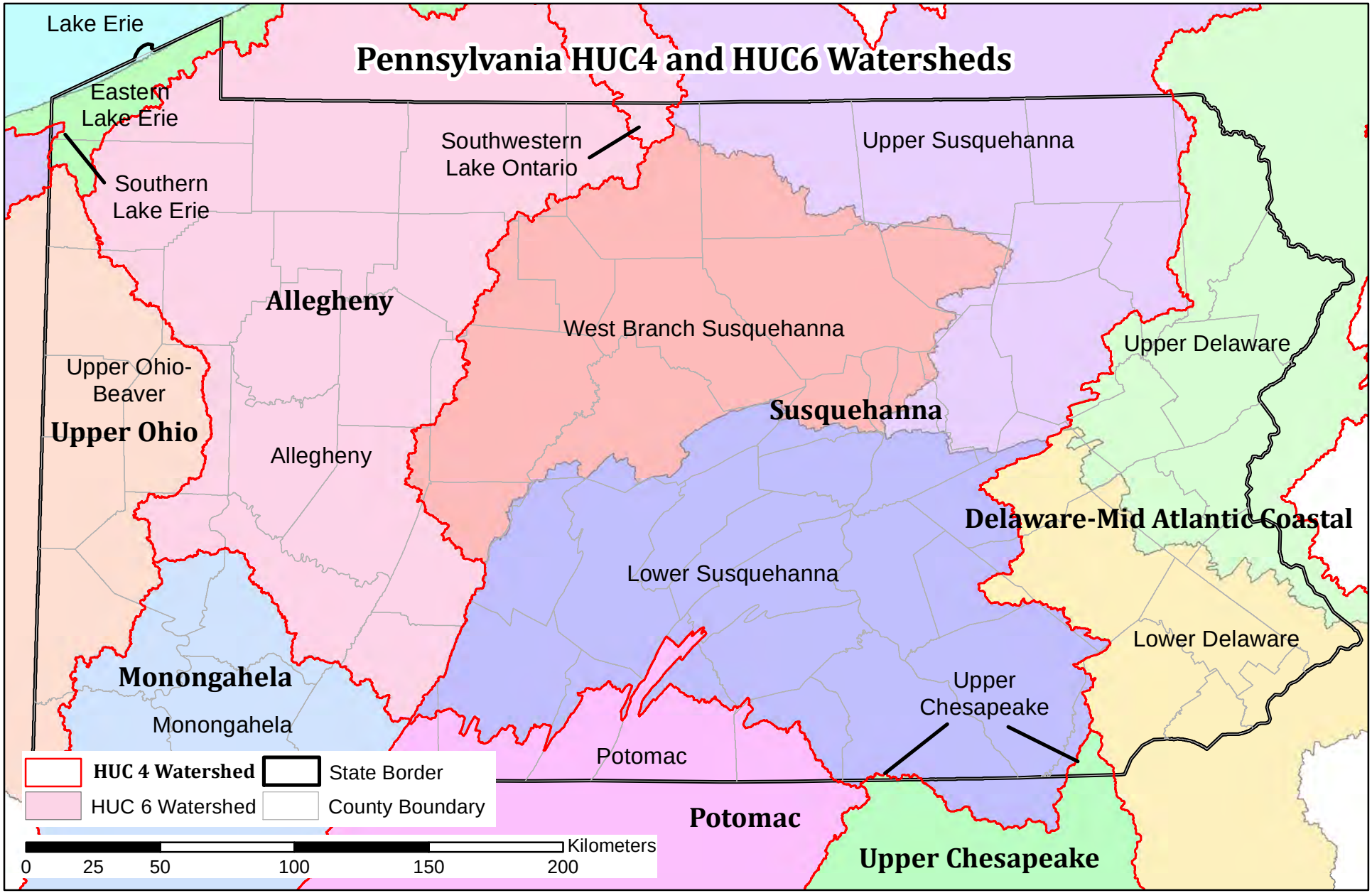
- *Reptile Species of Greatest Conservation Need*
- *Maps: Physiographic Provinces and HUC Watersheds*
- *Species Accounts (Click species name below or bookmark to navigate to species account)*

REPTILES

Eastern Mud Turtle
Spotted Turtle
Wood Turtle
Bog Turtle
Blanding's Turtle
Eastern Redbelly Turtle
Eastern Box Turtle
Eastern Fence Lizard
Northern Coal Skink
Broadhead Skink
Eastern Worm Snake
Kirtland's Snake
Eastern Hognose Snake
Rough Green Snake
Queen Snake
Eastern Ribbonsnake
Shorthead Garter Snake
Eastern Smooth Earth Snake
Mountain Earth Snake
Copperhead
Timber Rattlesnake
Eastern Massasauga

The following Physiographic Province and HUC Watershed maps are presented here for reference with conservation actions identified in the species accounts. Species account authors identified appropriate Physiographic Provinces or HUC Watershed (Level 4, 6, 8, 10, or statewide) for specific conservation actions to address identified threats. HUC watersheds used in this document were developed from the Watershed Boundary Dataset, a joint project of the U.S. Dept. of Agriculture-Natural Resources Conservation Service, the U.S. Geological Survey, and the Environmental Protection Agency.


Physiographic Provinces
Central Lowlands
Appalachian Plateaus
New England
Ridge and Valley
Piedmont
Atlantic Coastal Plain
Appalachian Plateaus
Central Lowlands
Piedmont
Atlantic Coastal Plain
New England
Ridge and Valley


Pennsylvania HUC4 and HUC6 Watersheds
Lake Erie
Eastern Lake Erie
Southern Lake Erie
Southwestern Lake Ontario
Upper Susquehanna
Allegheny
West Branch Susquehanna
Upper Delaware
Upper Ohio-Beaver
Upper Ohio
Susquehanna
Allegheny
Delaware-Mid Atlantic Coastal
Lower Susquehanna
Lower Delaware
Monongahela
Upper Chesapeake
Monongahela
Potomac
Potomac
Upper Chesapeake
HUC 4 Watershed
State Border
HUC 6 Watershed
County Boundary
Kilometers
0
25
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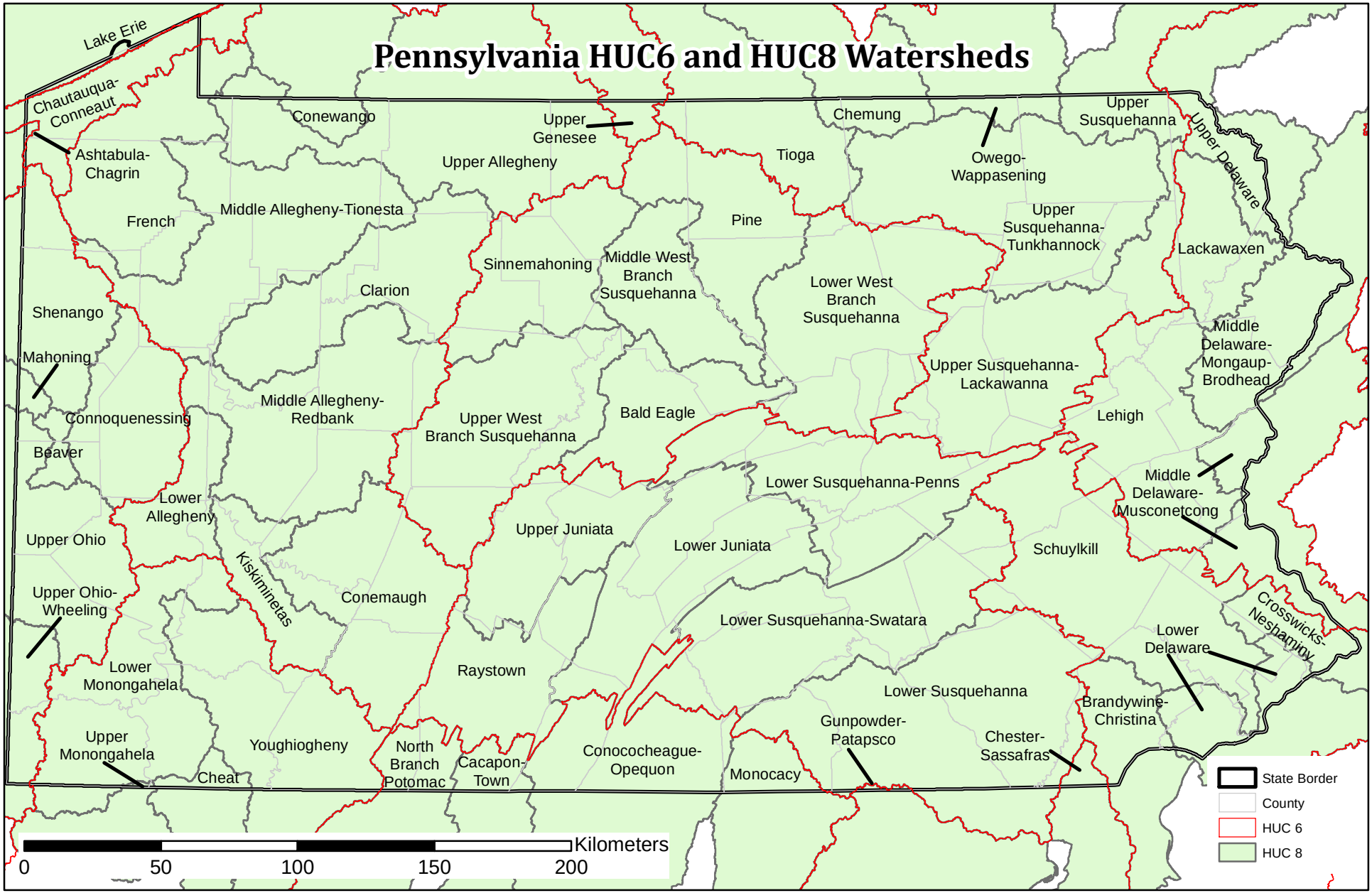
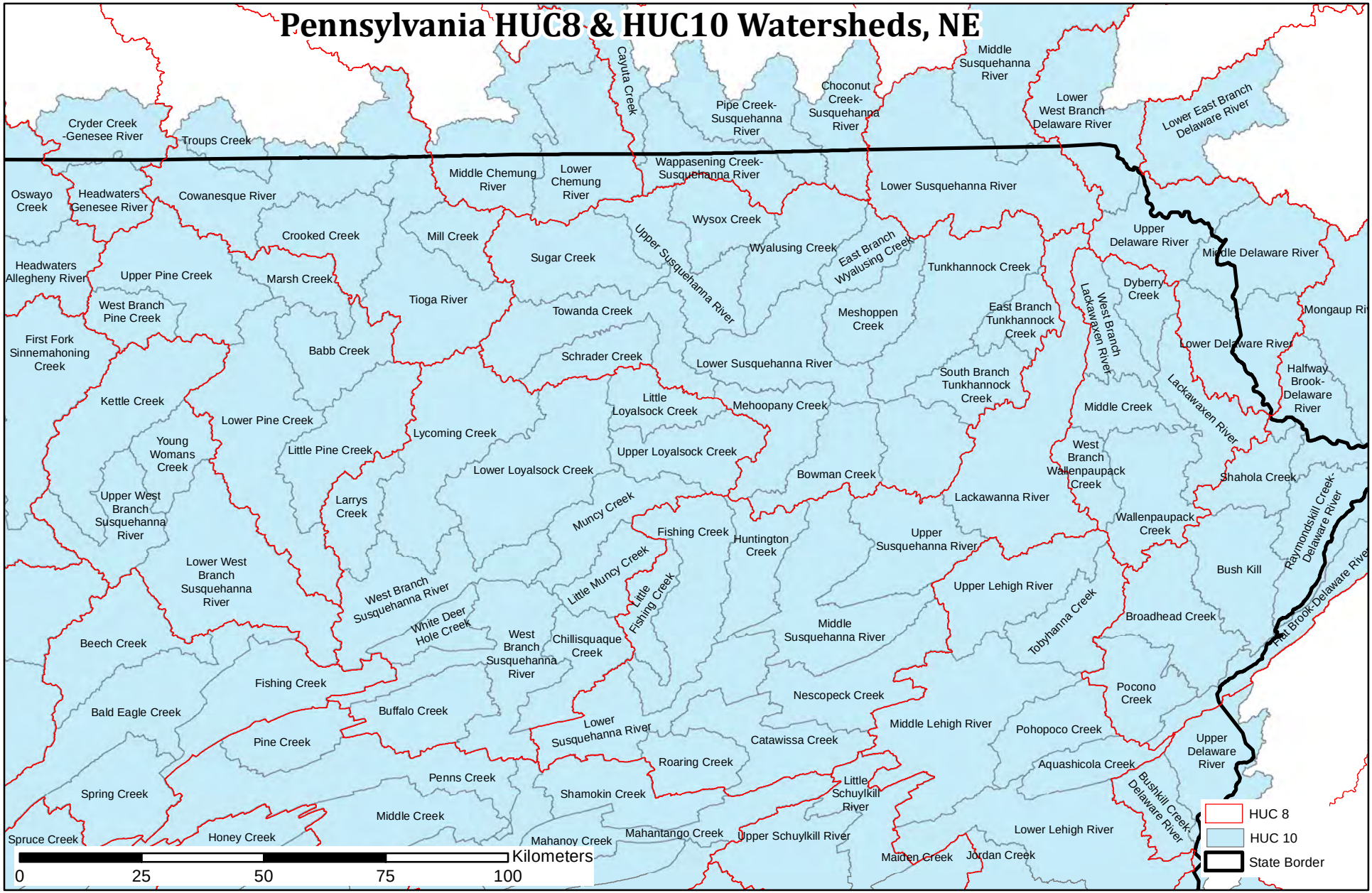
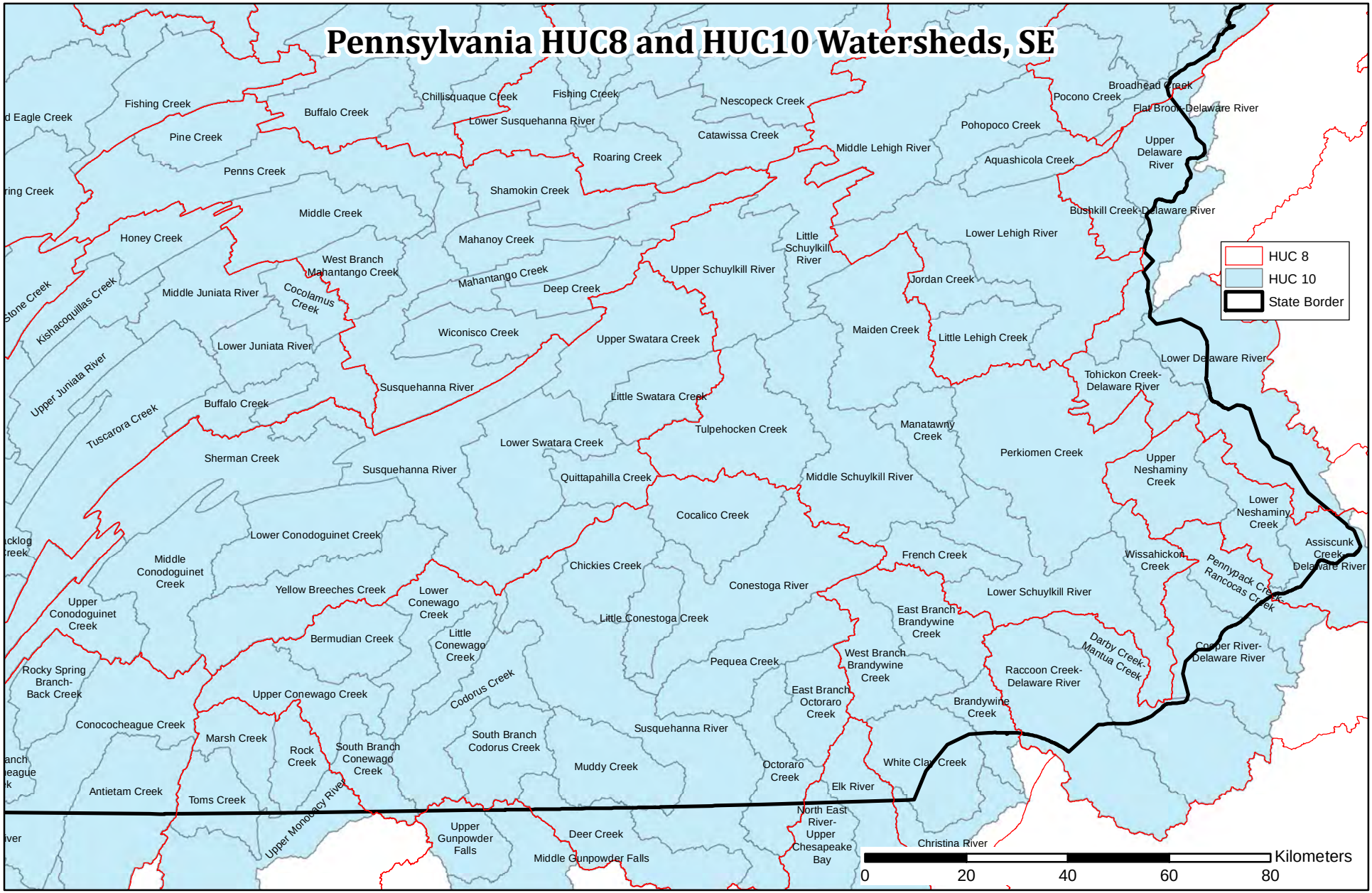
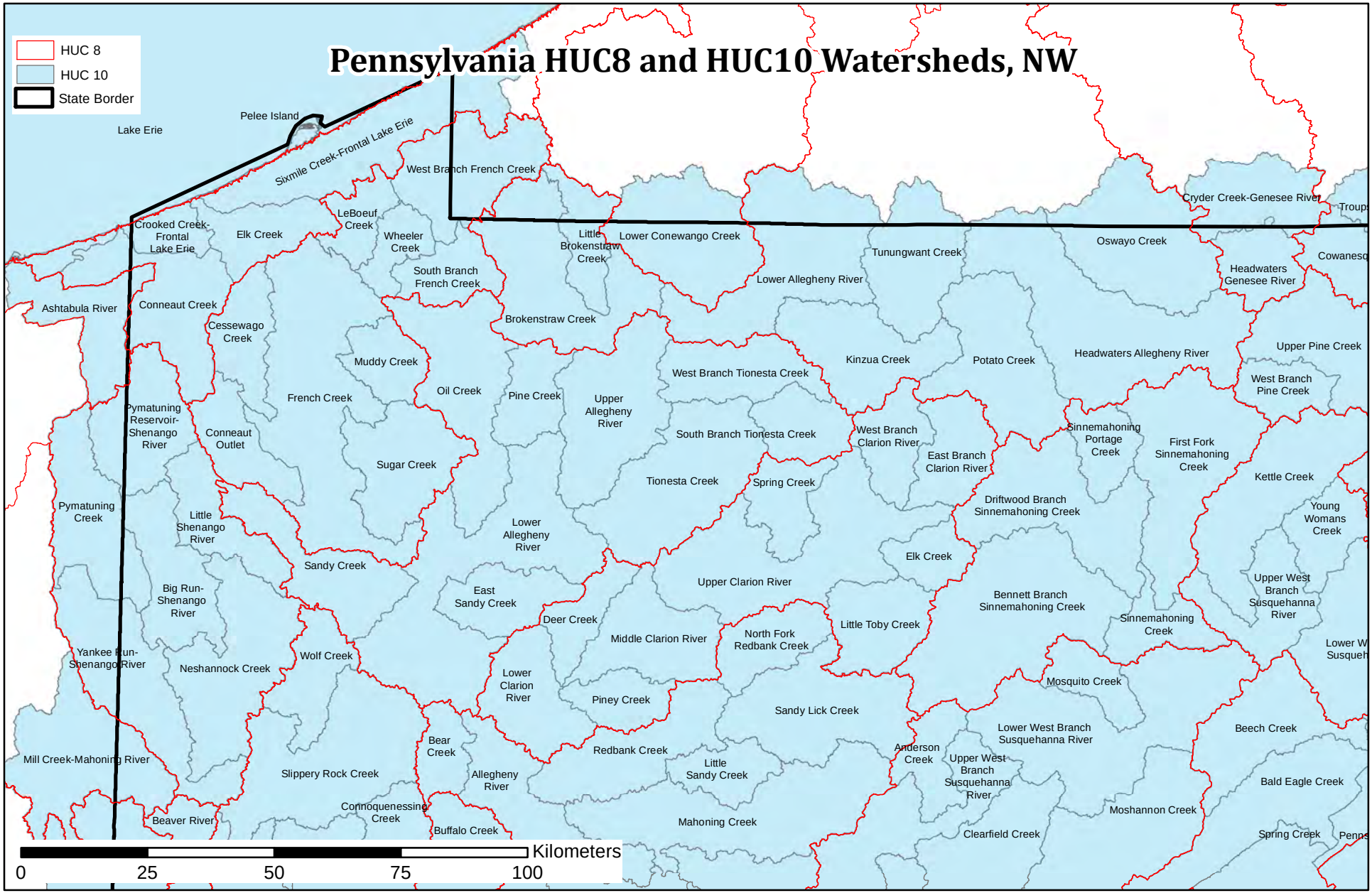
100
150
200


Pennsylvania HUC6 and HUC8 Watersheds
Lake Erie
Chautauqua-Conneaut
Ashtabula-Chagrin
Conewango
Upper Genesee
Upper Allegheny
Chemung
Tioga
Owego-Wappasening
Upper Susquehanna
Upper Delaware
French
Middle Allegheny-Tionesta
Pine
Upper Susquehanna-Tunkhannock
Lackawaxen
Sinnemahoning
Middle West Branch Susquehanna
Clarion
Lower West Branch Susquehanna
Shenango
Mahoning
Middle Delaware-Mongaup-Brodhead
Upper Susquehanna-Lackawanna
Middle Allegheny-Redbank
Connoquenessing
Upper West Branch Susquehanna
Bald Eagle
Lehigh
Beaver
Lower Susquehanna-Penns
Middle Delaware-Musconetcong
Lower Allegheny
Upper Juniata
Upper Ohio
Lower Juniata
Schuylkill
Kiskiminetas
Upper Ohio-Wheeling
Conemaugh
Crosswicks-Neshaminy
Lower Susquehanna-Swatara
Lower Delaware
Lower Monongahela
Raystown
Lower Susquehanna
Brandywine-Christina
Gunpowder-Patapsco
Upper Monongahela
Youghiogheny
North Branch Potomac
Cacapon-Town
Conococheague-Opequon
Chester-Sassafras
Cheat
Monocacy
State Border
County
HUC 6
HUC 8
Kilometers
0
50
100
150
200


Pennsylvania HUC8 & HUC10 Watersheds, NE
Cayuta Creek
Middle Susquehanna River
Choconut Creek-Susquehanna River
Pipe Creek-Susquehanna River
Lower West Branch Delaware River
Lower East Branch Delaware River
Cryder Creek -Genesee River
Troups Creek
Middle Chemung River
Lower Chemung River
Wappasening Creek-Susquehanna River
Lower Susquehanna River
Oswayo Creek
Headwaters Genesee River
Cowanesque River
Wysox Creek
Crooked Creek
Mill Creek
Upper Susquehanna River
Wyalusing Creek
East Branch Wyalusing Creek
Upper Delaware River
Middle Delaware River
Headwaters Allegheny River
Upper Pine Creek
Marsh Creek
Sugar Creek
Tunkhannock Creek
Dyberry Creek
West Branch Lackawaxen River
Tioga River
West Branch Pine Creek
Towanda Creek
Meshoppen Creek
East Branch Tunkhannock Creek
Mongaup Ri
First Fork Sinnemahoning Creek
Babb Creek
Schrader Creek
Lower Delaware River
Lower Susquehanna River
South Branch Tunkhannock Creek
Halfway Brook-Delaware River
Kettle Creek
Little Loyalsock Creek
Mehoopany Creek
Lackawaxen River
Middle Creek
Lower Pine Creek
Lycoming Creek
Young Womans Creek
Little Pine Creek
Upper Loyalsock Creek
West Branch Wallenpaupack Creek
Lower Loyalsock Creek
Bowman Creek
Shahola Creek
Upper West Branch Susquehanna River
Larrys Creek
Muncy Creek
Lackawanna River
Wallenpaupack Creek
Raymondskill Creek-Delaware River
Fishing Creek
Huntington Creek
Upper Susquehanna River
Lower West Branch Susquehanna River
Little Muncy Creek
Bush Kill
West Branch Susquehanna River
Little Fishing Creek
Upper Lehigh River
Tobyhanna Creek
White Deer Hole Creek
Broadhead Creek
Middle Susquehanna River
Beech Creek
West Branch Susquehanna River
Chillisquaque Creek
Fishing Creek
Nescopeck Creek
Pocono Creek
Bald Eagle Creek
Buffalo Creek
Lower Susquehanna River
Middle Lehigh River
Pohopoco Creek
Catawissa Creek
Pine Creek
Upper Delaware River
Roaring Creek
Aquashicola Creek
Penns Creek
Little Schuylkill River
Bushkill Creek-Delaware River
Spring Creek
Shamokin Creek
Middle Creek
Lower Lehigh River
Spruce Creek
Honey Creek
Mahanoy Creek
Mahantango Creek
Upper Schuylkill River
Maiden Creek
Jordan Creek
Kilometers
0
25
50
75
100
HUC 8
HUC 10
State Border


Pennsylvania HUC8 and HUC10 Watersheds, SE
HUC 8
HUC 10
State Border
Kilometers
0
20
40
60
80
Fishing Creek
Buffalo Creek
Chillisquaque Creek
Fishing Creek
Nescopeck Creek
Pocono Creek
Broadhead Creek
Flat Brook-Delaware River
Lower Susquehanna River
Pine Creek
Catawissa Creek
Pohopoco Creek
Upper Delaware River
Roaring Creek
Middle Lehigh River
Aquashicola Creek
Penns Creek
Shamokin Creek
Middle Creek
Bushkill Creek-Delaware River
Honey Creek
Mahanoy Creek
Little Schuylkill River
Lower Lehigh River
West Branch Mahantango Creek
Mahantango Creek
Upper Schuylkill River
Jordan Creek
Middle Juniata River
Cocolamus Creek
Deep Creek
Kishacoquillas Creek
Wiconisco Creek
Maiden Creek
Little Lehigh Creek
Lower Juniata River
Upper Swatara Creek
Lower Delaware River
Upper Juniata River
Susquehanna River
Tohickon Creek-Delaware River
Little Swatara Creek
Buffalo Creek
Tuscarora Creek
Tulpehocken Creek
Manatawny Creek
Lower Swatara Creek
Perkiomen Creek
Sherman Creek
Susquehanna River
Upper Neshaminy Creek
Quittapahilla Creek
Middle Schuylkill River
Lower Neshaminy Creek
Cocalico Creek
Lower Conodoguinet Creek
Assiscunk Creek
Middle Conodoguinet Creek
Chickies Creek
French Creek
Wissahickon Creek
Pennypack Creek
Delaware River
Yellow Breeches Creek
Lower Conewago Creek
Conestoga River
Rancocas Creek
Lower Schuylkill River
Upper Conodoguinet Creek
Little Conestoga Creek
East Branch Brandywine Creek
Bermudian Creek
Little Conewago Creek
Darby Creek-Mantua Creek
Cooper River-Delaware River
Pequea Creek
West Branch Brandywine Creek
Rocky Spring Branch-Back Creek
Raccoon Creek-Delaware River
Codorus Creek
Upper Conewago Creek
East Branch Octoraro Creek
Brandywine Creek
Conococheague Creek
Susquehanna River
Marsh Creek
South Branch Codorus Creek
Rock Creek
South Branch Conewago Creek
Muddy Creek
Octoraro Creek
White Clay Creek
Antietam Creek
Elk River
Toms Creek
Upper Monocacy River
North East River-Upper Chesapeake Bay
Upper Gunpowder Falls
Deer Creek
Christina River
Middle Gunpowder Falls


Pennsylvania HUC8 and HUC10 Watersheds, NW
HUC 8
HUC 10
State Border
Lake Erie
Pelee Island
Sixmile Creek-Frontal Lake Erie
West Branch French Creek
Crooked Creek-Frontal Lake Erie
Elk Creek
LeBoeuf Creek
Wheeler Creek
Little Brokenstraw Creek
Lower Conewango Creek
Tunungwant Creek
Oswayo Creek
Cryder Creek-Genesee River
Headwaters Genesee River
South Branch French Creek
Lower Allegheny River
Ashtabula River
Conneaut Creek
Cessewago Creek
Brokenstraw Creek
Muddy Creek
Kinzua Creek
Potato Creek
Headwaters Allegheny River
Upper Pine Creek
West Branch Pine Creek
West Branch Tionesta Creek
Oil Creek
Pine Creek
Upper Allegheny River
French Creek
Pymatuning Reservoir-Shenango River
Conneaut Outlet
South Branch Tionesta Creek
West Branch Clarion River
East Branch Clarion River
Sinnemahoning Portage Creek
First Fork Sinnemahoning Creek
Sugar Creek
Tionesta Creek
Spring Creek
Kettle Creek
Pymatuning Creek
Little Shenango River
Driftwood Branch Sinnemahoning Creek
Young Womans Creek
Lower Allegheny River
Sandy Creek
Elk Creek
Big Run-Shenango River
East Sandy Creek
Upper Clarion River
Bennett Branch Sinnemahoning Creek
Upper West Branch Susquehanna River
Deer Creek
Middle Clarion River
North Fork Redbank Creek
Little Toby Creek
Sinnemahoning Creek
Yankee Run-Shenango River
Neshannock Creek
Wolf Creek
Lower Clarion River
Mosquito Creek
Piney Creek
Sandy Lick Creek
Lower West Branch Susquehanna River
Beech Creek
Bear Creek
Redbank Creek
Anderson Creek
Mill Creek-Mahoning River
Slippery Rock Creek
Allegheny River
Little Sandy Creek
Upper West Branch Susquehanna River
Bald Eagle Creek
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Spring Creek
Kilometers
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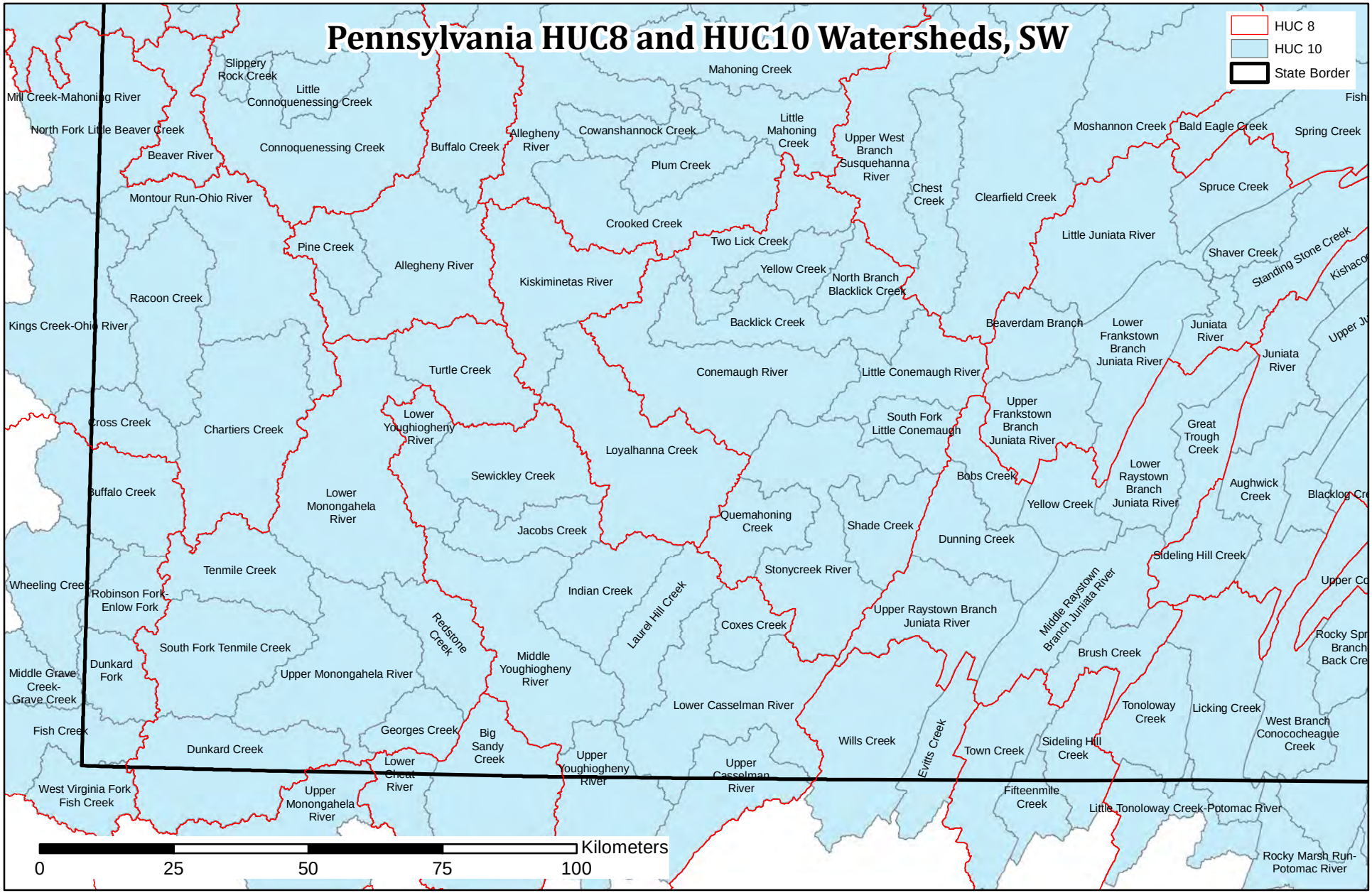
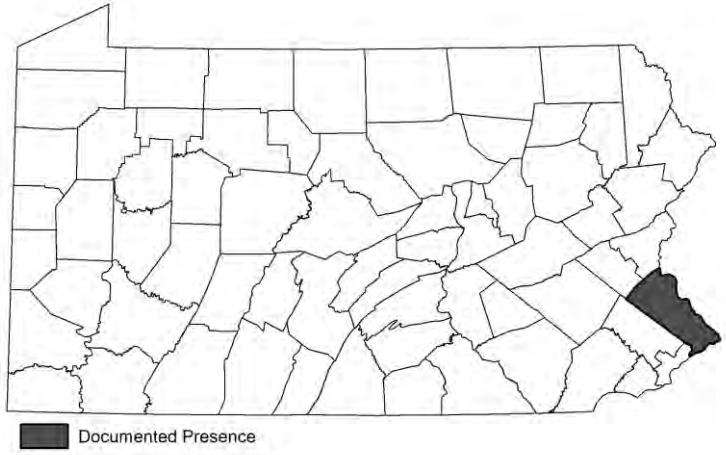

Pennsylvania HUC8 and HUC10 Watersheds, SW
HUC 8
HUC 10
State Border
Mill Creek-Mahoning River
Slippery Rock Creek
Little Connoquenessing Creek
Mahoning Creek
North Fork Little Beaver Creek
Beaver River
Connoquenessing Creek
Buffalo Creek
Allegheny River
Cowanshannock Creek
Little Mahoning Creek
Upper West Branch Susquehanna River
Moshannon Creek
Bald Eagle Creek
Spring Creek
Plum Creek
Chest Creek
Clearfield Creek
Spruce Creek
Montour Run-Ohio River
Crooked Creek
Two Lick Creek
Little Juniata River
Pine Creek
Allegheny River
Kiskiminetas River
Yellow Creek
North Branch Blacklick Creek
Shaver Creek
Standing Stone Creek
Racoon Creek
Backlick Creek
Beaverdam Branch
Lower Frankstown Branch Juniata River
Juniata River
Kings Creek-Ohio River
Turtle Creek
Conemaugh River
Little Conemaugh River
Juniata River
Cross Creek
Chartiers Creek
Lower Youghiogheny River
South Fork Little Conemaugh
Upper Frankstown Branch Juniata River
Great Trough Creek
Loyalhanna Creek
Sewickley Creek
Bobs Creek
Lower Raystown Branch Juniata River
Aughwick Creek
Buffalo Creek
Lower Monongahela River
Yellow Creek
Quemahoning Creek
Shade Creek
Jacobs Creek
Dunning Creek
Sideling Hill Creek
Tenmile Creek
Stonycreek River
Wheeling Creek
Robinson Fork-Enlow Fork
Indian Creek
Laurel Hill Creek
Middle Raystown Branch Juniata River
Upper Raystown Branch Juniata River
Coxes Creek
Redstone Creek
South Fork Tenmile Creek
Brush Creek
Middle Youghiogheny River
Dunkard Fork
Upper Monongahela River
Middle Grave Creek-Grave Creek
Lower Casselman River
Tonoloway Creek
Licking Creek
Fish Creek
Georges Creek
Big Sandy Creek
Wills Creek
Evitts Creek
Town Creek
Sideling Hill Creek
West Branch Conococheague Creek
Dunkard Creek
Lower Cheat River
Upper Youghiogheny River
Upper Casselman River
West Virginia Fork Fish Creek
Upper Monongahela River
Fifteenmile Creek
Little Tonoloway Creek-Potomac River
Rocky Marsh Run-Potomac River
Kilometers
0
25
50
75
100

Eastern Mud Turtle

Kinosternon subrubrum subrubrum

Chris Urban, Kathy Gipe, Brandon Ruhe
PA Fish & Boat Commission, Western Pennsylvania Conservancy,
The Mid-Atlantic Center for Herpetology and Conservation.

Photo: Tom Diez



CONSERVATION PROFILE

Global Rank	**G5T5**	State Rank	**S1**
IUCN Red List	**LC Least Concern**	PA Legal Status	**Endangered**
Northeast Region	**Not NE Regional SGCN**	PA Abundance	**Unknown**
Federal Status	**Not Listed**	PA Short-Term Trend (10 year)	**Unknown**

Conservation Goal:

Protect, augment (where needed), and maintain known populations; add one self-sustaining population within 10 years.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	**Coastal Plain Swamp**	
Habitat	**North Atlantic Coastal Plain Basin Swamp and Wet Hardwood Forest**	

Specific Habitat Requirements:

Atlantic Coastal Plain wetlands with intact uplands.

THREATS AND ACTIONS

IUCN Threat: 1.0 Residential and Commercial Development

Specific Threat: Development can alter wetland hydrology, water quality, and fragment habitats, thus isolating populations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Continue consultations with developers to protect species habitats and incorporate habitat management into plans. Proactive land protection would also be beneficial.	To prevent development related impacts to mud turtle populations.	Number of consultations that protect eastern mud turtle habitat.	Spot-check 25% of projects to confirm adherence to recommended mitigation actions.	1

Action Location: Physiographic Province: Atlantic Coastal Plains

Associated Species: Redbelly turtle, northern cricket frog, eastern spadefoot, New Jersey chorus frog, wetland wildlife.

IUCN Threat: 11.0 Climate Change and Severe Weather

Specific Threat: Increased drought and dessication of wetlands (at one of the two sites) lead to direct mortality.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 10.0 Species Reintroduction and Stocking Reintroduce eastern mud turtles at sites that are more resilient to drought situations.	To reintroduce one population within the next 10 years.	Reproductive success.	Establish long-term monitoring program, radio-telemetry.	1

Action Location: Physiographic Province: Atlantic Coastal Plains

THREATS AND ACTIONS

IUCN Threat: 4.0 Transportation and Service Corridors

Specific Threat: Chemical spraying and heavy equipment moving.

Action		Objective	Measure	Monitoring	Priority
TRACS Action 1.0	Coordination and Administration	To prevent improper ROW management .	Number of sites properly managed (ROW).	Spot-check 25% of projects to confirm adherence to recommended mitigation actions.	2
Consult with utlitlity company to help guide Right-Of-Way (ROW) habitat management.					

Action Location: Physiographic Province: Atlantic Coastal Plains

Associated Species: Redbelly turtle, northern cricket frog, eastern spadefoot, New Jersey chorus frog, wetland wildlife.

RESEARCH NEEDS

1. Develop a reintroduction and augmentation protocol for the eastern mud turtle.
2. Evaluate effectiveness of reintroduction and augmentation initiatives.
3. Assess effectiveness of nest site protection.

THREATS AND ACTIONS

IUCN Threat: 4.0 Transportation and Service Corridors

Specific Threat: Roadkills are a major source of mortality .

Action	Objective	Measure	Monitoring	Priority

SURVEY NEEDS

1. Develop and implement population monitoring protocol for extant sites.

2. Trap and transfer turtles from adjacent states (e.g., NJ, DE, MD).

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
No Current Monitoring Programs			

Spotted Turtle

Clemmys guttata

Chris Urban, Kathy Gipe, Brandon Ruhe
PA Fish & Boat Commission, Western Pennsylvania Conservancy,
The Mid-Atlantic Center for Herpetology and Conservation.

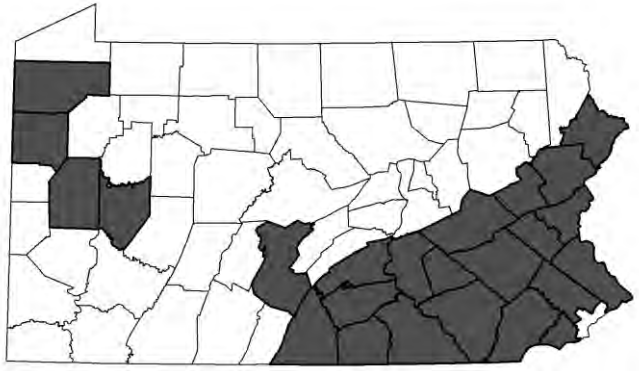
Photo: Tom Diez

CONSERVATION PROFILE

Global Rank	**G5 Secure**	State Rank	**S3S4**
IUCN Red List	**EN Endangered**	PA Legal Status	**Not Listed**
Northeast Region	**Very High Concern / Low Responsibility**	PA Abundance	**Unknown**
Federal Status	**Not Listed**	PA Short-Term Trend (10 year)	**Relatively Stable (<=10% change)**

Conservation Goal:

Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.



Documented Presence

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	**Central Oak-Pine**	**Northern Swamp**
Habitat	**Northeastern Interior Dry-Mesic Oak Forest**	**North-Central Interior and Appalachian Rich Swamp**

Specific Habitat Requirements:

Soft-bottomed aquatic habitats, including small streams, marshes, swamps, and vernal pools with upland forests or open habitats.

THREATS AND ACTIONS

IUCN Threat: 5.0 Biological Resource Use

Specific Threat: Poaching.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 7.0 Law enforcement Instruct all new officers (new officer classes) and update experienced officers in anti-poaching (once every 5 years).	Train and support law enforcement in anti-poaching efforts.	Number of trainings.	Determine officer readiness through tests at the end of training.	1

Action Location: Physiographic Province: Statewide

Associated Species: All native amphibian and reptile species, especially those deemed vulnerable to the black market trade.

IUCN Threat: 1.0 Residential and Commercial Development

Specific Threat: Development can alter wetland hydrology, water quality, and fragment habitats, thus isolating populations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Conduct targeted surveys across their range.	Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.	Number of blocks surveyed (PARS).	PARS annual report of activities.	3

Action Location: Physiographic Province: Statewide

THREATS AND ACTIONS

IUCN Threat: 4.0 Transportation and Service Corridors

Specific Threat: Roads fragment habitats, create corridors for invasive species spread, disrupt movement corridors, and alter site microclimate.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Conduct targeted surveys across their range.	Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.	Number of blocks surveyed (PARS).	PARS annual report of activities.	3

Action Location: Physiographic Province: Statewide

RESEARCH NEEDS

1. Investigate various causes of mortality to all life stages of turtles (i.e., predation, road mortality, collecting) to determine the relative impact of each, including determination of methods to reduce mortality during critical life stages.

2. Examine the effects of habitat loss and fragmentation on population viability and dispersal, particularly in relation to metapopulation dynamics.

SURVEY NEEDS

1. The most pressing research need is to implement a thorough status assessment and monitoring program for the species. Intensive surveys are needed to determine present distribution and status, particularly in areas of the state with historic records of occurrence but no recent sightings, as well as areas that have not been adequately surveyed. These surveys should be followed up with monitoring activities at selected sites to detect changes in numbers.

MONITORING PROGRAMS

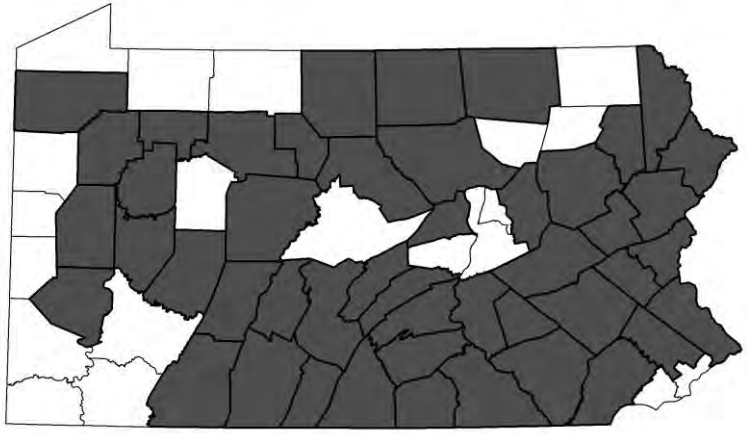
Program Name	Lead Agency	Hyperlink	Description
No Current Monitoring Programs			

Wood Turtle

Glyptemys insculpta

Chris Urban, Kathy Gipe, Brandon Ruhe
PA Fish & Boat Commission, Western Pennsylvania Conservancy,
The Mid-Atlantic Center for Herpetology and Conservation.

Photo: Jackie Carey



Documented Presence

CONSERVATION PROFILE

Global Rank	**G3 Vulnerable**	State Rank	**S3S4**
IUCN Red List	**EN Endangered**	PA Legal Status	**Not Listed**
Northeast Region	**Very High Concern / High Responsibility**	PA Abundance	**Unknown**
Federal Status	**Not Listed**	PA Short-Term Trend (10 year)	**Relatively Stable (<=10% change)**

Conservation Goal:

Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	**Small Rivers**	
Habitat	**Moderate Gradient, Cool, Small River**	

Specific Habitat Requirements:

Large streams and associated riparian and forested habitats (edge habitats) with thick cover, sunlight, and food availability. Nesting habitat is open-canopy riparian thickets, well-drained soils with sparse vegetation.

THREATS AND ACTIONS

IUCN Threat: 5.0 Biological Resource Use

Specific Threat: Poaching.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 7.0 Law enforcement Instruct all new officers (new officer classes) and update experienced officers in anti-poaching (once every 5 years).	Train and support law enforcement in anti-poaching efforts.	Number of trainings.	Determine officer readiness through tests at the end of training.	1

Action Location: Physiographic Province: Statewide

Associated Species: All native amphibian and reptile species, especially those deemed vulnerable to the black market trade.

IUCN Threat: 1.0 Residential and Commercial Development

Specific Threat: Habitat loss and fragmentation through residential and commercial development.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Conduct targeted surveys across their range.	Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.	Number of blocks surveyed (PARS).	PARS annual report of activities; wood turtle Competitive State & Tribal Wildlife Grant report of activities.	3

Action Location: Physiographic Province: Statewide

THREATS AND ACTIONS

IUCN Threat: 3.0 Energy Production and Mining

Specific Threat: Habitat loss and fragmentation from industrial development.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Conduct targeted surveys across their range.	Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.	Number of blocks surveyed (PARS).	PARS annual report of activities; wood turtle Competitive State & Tribal Wildlife Grant report of activities.	3

Action Location: Physiographic Province: Statewide

IUCN Threat: 4.0 Transportation and Service Corridors

Specific Threat: Mortality and habitat fragmentation from road and railroad corridors.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Conduct targeted surveys across their range.	Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.	Number of blocks surveyed (PARS).	PARS annual report of activities; wood turtle Competitive State & Tribal Wildlife Grant report of activities.	3

Action Location: Physiographic Province: Statewide

RESEARCH NEEDS

1. Examine nesting ecology and nesting habitats of *G. insculpta* in Pennsylvania, including identification of critical nesting habitats in need of protection or management.

2. Assess relationships between *G. insculpta* population dynamics and specific agricultural and forest management practices.

SURVEY NEEDS

1. Continue species occurrence surveys to confirm sites and search for additional records.

2. Continue long-term monitoring sampling of established sites.

MONITORING PROGRAMS

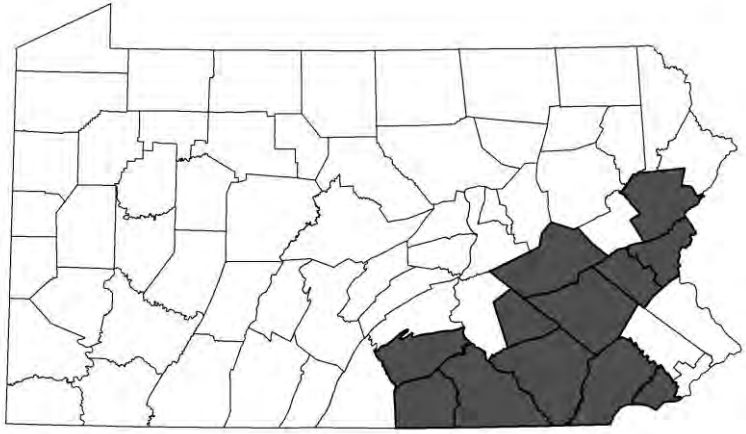
Program Name	Lead Agency	Hyperlink	Description
Conservation Planning and Implementation for the Wood Turtle and Associated Riparian Species of Greatest Conservation Need from Maine to Virginia.	Massachusetts Dept. Fish and Wildlife		To identify, protect, manage, and enhance functional riparian and riverine habitats for wildlife in New England, New York, Pennsylvania, New Jersey, Delaware, Maryland, West Virginia, Virginia, and the District of Columbia through coordinated conservation actions identified in the 2011–2013 (NEAFWA RCN) Wood Turtle Status Assessment, outlined in SWAPs across the region, and necessary to support healthy and persistent populations of wood turtles and other riparian and riverine Species of Greatest Conservation Need.

Bog Turtle

Glyptemys muhlenbergii

Chris Urban, Kathy Gipe, Brandon Ruhe
PA Fish & Boat Commission, Western Pennsylvania Conservancy,
The Mid-Atlantic Center for Herpetology and Conservation.

Photo: Tom Diez



Documented Presence

CONSERVATION PROFILE

Global Rank	**G3 Vulnerable**	State Rank	**S2**
IUCN Red List	**CR Critically Endangere**	PA Legal Status	**Endangered**
Northeast Region	**Very High Concern / High Responsibility**	PA Abundance	**Unknown**
Federal Status	**Not Listed**	PA Short-Term Trend (10 year)	**Decline of 11 - 40%**

Conservation Goal:

Implement habitat protection and restoration measures as per Species Action Plan. Continue to acquire and/or secure easements for occupied bog turtle habitat. Continue to manage succession and invasive plant species in occupied bog turtle habitat. Complete historic site surveys, continue gap area surveys.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	**#N/A**	**#N/A**
Habitat	**Lotic**	

Specific Habitat Requirements:

Sunny, emergent, early-successional wetlands with dense tussock sedge and other tussock-forming vegetation, soft mud and shallow water.

THREATS AND ACTIONS

IUCN Threat: 1.0 Residential and Commercial Development

Specific Threat: Development can alter wetland hydrology, water quality, and fragment habitats, thus isolating populations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Continue consultations with developers to protect species habitats and incorporate habitat management into plans. Proactive land protection would also be beneficial.	To prevent development related impacts to bog turtle populations.	Number of consultations that protect bog turtle habitat.	Spot-check 25% of projects to confirm adherence to recommended mitigation actions.	1

Action Location: Physiographic Province: New England, Piedmont, Ridge and Valley

Associated Species: Spotted turtles, wetland birds.

IUCN Threat: 5.0 Biological Resource Use

Specific Threat: Poaching/ illegal trade.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 7.0 Law enforcement Instruct all new officers (new officer classes) and update experienced officers in anti-poaching (once every 5 years).	Train and support law enforcement in anti-poaching efforts.	Number of trainings.	Determine officer readiness through tests at the end of training.	1

Action Location: Physiographic Province: New England, Piedmont, Ridge and Valley

Associated Species: All native amphibian and reptile species, especially those deemed vulnerable to the black market trade.

THREATS AND ACTIONS

IUCN Threat: 7.0 Natural System Modifications

Specific Threat: Succession of habitats from early seral stage wetlands to wooded swamps.

Action		Objective	Measure	Monitoring	Priority
TRACS Action 2.0	Direct Management of Natural Resources	Complete management plans for 100% of protected sites; implement management at 50-100 acres per year.	Number of management plans, number of acres managed.	Use regionally developed long-term monitoring strategy.	1

Complete management plans for protected sites. Manage habitat, through grazing and other forms of vegetation management, to become suitable for bog turtle nesting. Initiate restoration in early successional wetland habitat as deemed necessary.

Action Location: Physiographic Province: New England, Piedmont, Ridge and Valley

Associated Species: Spotted turtles, wetland birds.

IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

Specific Threat: Various invasive plants (e.g., Reed Canary Grass and Phragmites) will eliminate nesting habitats if left unchecked.

Action		Objective	Measure	Monitoring	Priority
TRACS Action 2.0	Direct Management of Natural Resources	Complete management plans for 100% of protected sites; implement management at 50-100 acres per year.	Number of management plans, number of acres managed.	Use regionally developed long-term monitoring strategy.	1

Complete management plans for protected sites. Manage habitat, through grazing and other forms of vegetation management, to become suitable for bog turtle nesting. Initiate restoration in early successional wetland habitat as deemed necessary.

Action Location: Physiographic Province: New England, Piedmont, Ridge and Valley

Associated Species: Spotted turtles, wetland birds.

THREATS AND ACTIONS

IUCN Threat: 4.0 Transportation and Service Corridors

Specific Threat: Roads are major sources of mortality, fragment habitats, create corridors for invasive species spread, and alter site chemistry.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Design and implement wildlife crossings for identified travel corridors.	To reduce roadkills by installing 5 wildlife crossings (e.g., drift fence/culvert) in 10 years.	Number of crossings installed, number of roadkills.	Annual inspections of structure; use trailcams to monitor use of structures during active season; count annual roadkills.	2

Action Location: Physiographic Province: New England, Piedmont, Ridge and Valley

Associated Species: Aquatic turtles, riparian zone species.

RESEARCH NEEDS

1. Develop spatially explicit metrics to prioritize and rank bog turtle sites within each recovery unit, for survey effort, habitat protection, population and habitat management, and other conservation actions.

3. Evaluate response of bog turtles to habitat restoration actions.

2. Survey sites where a mortality event recent occurred (>5 dead turtles within the same year) to identify the cause.

SURVEY NEEDS

1. Complete assessment of historic sites, continue to survey and assess gap areas in range of bog turtle.

2. Perform pre- and post-habitat monitoring surveys at restored or managed sites, particularly at sites where NRCS is funding work.

3. Collect, organize and enter existing EO and survey data into a centralized, secure database.

MONITORING PROGRAMS

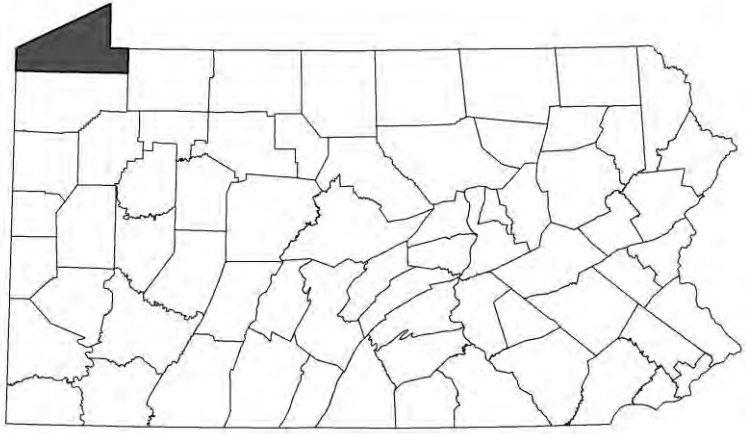
Program Name	Lead Agency	Hyperlink	Description
Multistate Recovery Actions for the Bog Turtle and Associated Headwater Wetland Species of Greatest Conservation Need	Pennsylvania Fish and Boat Commission		Implement competitve state wildlife grant to protect and maintain the northern population of bog turtle and its habitat through planning and implementation of conservation actions that will lead to the recovery of the species.
Northeast Regional Population and Habitat Monitoring for the Bog Turtle	MACHAC		Continue implementation of a previously developed standardized regional monitoring protocol (NFWF grant project), formalizing and expanding on intensive population and habitat sampling efforts.

Blanding's Turtle

Emydoidea blandingii

Chris Urban, Kathy Gipe, Brandon Ruhe
PA Fish & Boat Commission, Western Pennsylvania Conservancy,
The Mid-Atlantic Center for Herpetology and Conservation.

Photo: Tom Diez



Documented Presence

CONSERVATION PROFILE

Global Rank	**G4 Apparently secur**	State Rank	**S1**
IUCN Red List	**EN Endangered**	PA Legal Status	**Candidate**
Northeast Region	**Very High Concern / Low Responsibility**	PA Abundance	**Unknown**
Federal Status	**Not Listed**	PA Short-Term Trend (10 year)	**Unknown**

Conservation Goal:

To establish a self-sustaining population of Blanding's turtles at one site in Pennsylvania.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	**Coastal Grassland & Shrubland**	
Habitat	**Great Lakes Dune and Swale**	

Specific Habitat Requirements:

Mosaics of small marshes, wet meadows, small ponds, and slow moving streams.

THREATS AND ACTIONS

IUCN Threat: 1.0 Residential and Commercial Development

Specific Threat: Improper habitat manipulation; roadkill; nest predation from overabundant predators.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Implement Northeast Regional Blanding's Turtle Conservation Plan at the known site for this species.	To establish a self-sustaining population of Blanding's turtles at one site in Pennsylvania.	Population estimate.	Nest site surveys and monitoring; mark-recapture surveys every five years.	2

Action Location: Physiographic Province: Central Lowland
HUC4 Watershed: E. Lake Erie-Lake Erie

RESEARCH NEEDS

1. Radiotrack all adult Blanding's turtles encountered and focus tracking efforts during the nesting season to locate nesting areas and determine reproductive status.

2. Evaluate feasibility and appropriateness of augmentation from other sites in the Lake Erie basin and reintroduction into Pymatuning and Conneaut systems.

3. Genetic investigation of PA specimens.

SURVEY NEEDS

1. Continue distributional survey efforts: Inventory resources should be spent examining habitats within the range to establish the present distribution of the Blanding's turtle in Pennsylvania.

2. Continue monitoring the site for roadkill of Blanding's and other turtle species to evaluate road-crossing hotspots, and identify areas to place road crossing signs.

MONITORING PROGRAMS

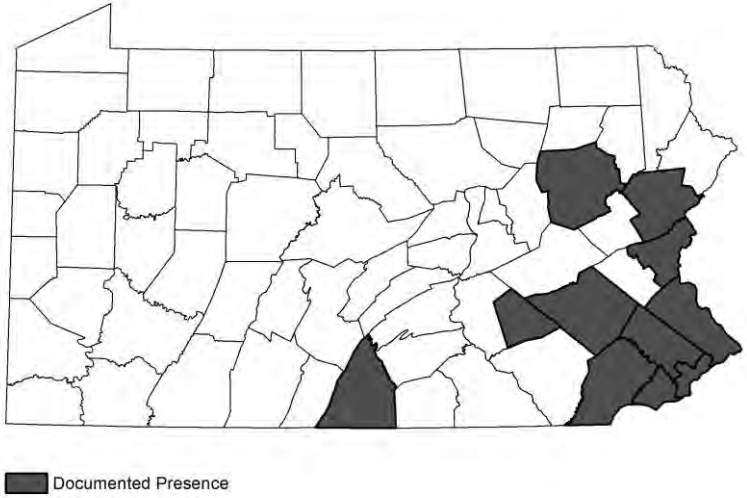
Program Name	Lead Agency	Hyperlink	Description
Conservation of Blanding's Turtle and associated wetland SGCN in the Northeas.	New Hampshire Fish and Game Department		To maintain and enhance functional wildlife habitat in New England, New York, and Pennsylvania by applying conservation principles and practices needed to support a healthy Blanding's turtle population. In the short-term, project partners will cooperate to develop a spatially-explicit conservation plan for Blanding's turtles and associated SGCN in the Northeast Region of the United States, initiate standardized monitoring of the species' status, and initiate implementation of the Plan by managing habitat to reduce road mortality and engaging key partners to prioritize land acquisition, restoration, and management activities. In the long-term, conservation partners will apply information developed through this grant to maintain viable populations of Blanding's turtle and associated SGCN.

Eastern Redbelly Turtle

Pseudemys rubriventris

Chris Urban, Kathy Gipe, Brandon Ruhe
PA Fish & Boat Commission, Western Pennsylvania Conservancy,
The Mid-Atlantic Center for Herpetology and Conservation.

Photo: Tom Diez



CONSERVATION PROFILE

Global Rank	**G5 Secure**	State Rank	**S2S3**
IUCN Red List	**NT Near Threatened**	PA Legal Status	**Threatened**
Northeast Region	**High Concern / High Responsibility**	PA Abundance	**Unknown**
Federal Status	**Not Listed**	PA Short-Term Trend (10 year)	**Relatively Stable (<=10% change)**

Conservation Goal:

Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will lead to delisting of the species.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	**Coastal Plain Swamp**	
Habitat	**North Atlantic Coastal Plain Basin Swamp and Wet Hardwood Forest**	

Specific Habitat Requirements:

Relatively deep waterbodies such as moderate gradient rivers, reservoirs, ponds, and marshes.

THREATS AND ACTIONS

IUCN Threat: 1.0 Residential and Commercial Development

Specific Threat: Development of uplands destroys nesting habitat, and redevelopment of industrial sites often results in alteration of former industrial waste ponds, now occupied habitat.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Continue consultations with developers to protect species habitats and incorporate habitat management into plans. Proactive land protection would also be beneficial.	To prevent development related impacts to redbelly turtle populations.	Number of consultations that protect redbelly turtle habitat.	Spot-check 25% of projects to confirm adherence to recommended mitigation actions.	1

Action Location: HUC6 Watershed: Lwr Delaware, Lwr Susquehanna, Potomac

Associated Species: Aquatic turtles, riparian zone species.

IUCN Threat: 1.0 Residential and Commercial Development

Specific Threat: Development of uplands destroys nesting habitat.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Continue consultations with developers to protect species habitats and incorporate habitat management into plans. Proactive land protection would also be beneficial.	To prevent development related impacts to redbelly turtle populations.	Number of consultations that protect redbelly turtle habitat.	Spot-check 25% of projects to confirm adherence to recommended mitigation actions.	1

Action Location: HUC6 Watershed: Lwr Delaware, Lwr Susquehanna, Potomac

Associated Species: Aquatic turtles, riparian zone species.

THREATS AND ACTIONS

IUCN Threat: 3.0 Energy Production and Mining

Specific Threat: Proposed gravel mining and winter dredging at riverine and wetland sites in the extreme SE portion of the range can destroy habitats and kill brumating turtles.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Continue consultations with developers to protect species habitats and incorporate habitat management into plans. Proactive land protection would also be beneficial.	To prevent development related impacts to redbelly turtle populations.	Number of consultations that protect redbelly turtle habitat.	Spot-check 25% of projects to confirm adherence to recommended mitigation actions.	1

Action Location: HUC6 Watershed: Lwr Delaware, Lwr Susquehanna, Potomac

Associated Species: Aquatic turtles, riparian zone species.

IUCN Threat: 4.0 Transportation and Service Corridors

Specific Threat: Wave action in Delaware River relegates basking to sheltered coves and compromises aquatic vegetation beds where juveniles forage.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Enhance habitat; manage nest sites; and add basking structures at protected sites.	Propose management plans at 50% of publicly owned eastern redbelly turtle properties in the next 10 years.	Number of sites under management.	Monitor use of basking platforms and nest sites once every five years at each managed site.	2

Action Location: HUC6 Watershed: Lwr Delaware, Lwr Susquehanna, Potomac

Associated Species: Aquatic turtles, riparian zone species.

THREATS AND ACTIONS

IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

Specific Threat: Subsidized meso-predators in the SE Pennsylvania are responsible for major nest depredations.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Enhance habitat; manage nest sites; and add basking structures at protected sites.	Propose management plans at 50% of publicly owned eastern redbelly turtle properties in the next 10 years.	Number of sites under management.	Monitor use of basking platforms and nest sites once every five years at each managed site.	2

Action Location: HUC6 Watershed: Lwr Delaware, Lwr Susquehanna, Potomac

Associated Species: Aquatic turtles, riparian zone species.

IUCN Threat: 8.0 Invasive and Other Problematic Species and Genes

Specific Threat: Competition from Red-eared Sliders; reduced nest site availability due to invasive vegetation.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Enhance habitat; manage nest sites; and add basking structures at protected sites.	Propose management plans at 50% of publicly owned eastern redbelly turtle properties in the next 10 years.	Number of sites under management.	Monitor use of basking platforms and nest sites once every five years at each managed site.	2

Action Location: HUC6 Watershed: Lwr Delaware, Lwr Susquehanna, Potomac

Associated Species: Aquatic turtles, riparian zone species.

THREATS AND ACTIONS

IUCN Threat: 4.0 Transportation and Service Corridors

Specific Threat: Mortality and habitat fragmentation from road and railroad corridors.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Design and implement wildlife crossings for identified travel corridors.	To reduce roadkills by installing 5 wildlife crossings (e.g., drift fence/culvert) in 10 years.	Number of crossings installed, number of roadkills.	Annual inspections of structure; use trailcams to monitor use of structures during active season; count annual roadkills.	3

Action Location: HUC6 Watershed: Lwr Delaware, Lwr Susquehanna, Potomac

Associated Species: Aquatic turtles, riparian zone species.

RESEARCH NEEDS

1. Conduct habitat use and movement study of riverine redbelly turtles; turtles inhabiting impoundments and ponds are relatively easy to manage and study, but redbelly turtles in Pennsylvania also occur in large river systems. A better understanding of the habitat use of the turtles in these rivers with regards to basking, nesting, foraging, and hibernating is critical to protection of these habitats. Radio telemetry techniques will be necessary to better understand the daily and seasonal movements of riverine redbellies.

3. Nesting success: anecdotal evidence indicates high levels of nest predation on redbelly turtle nests. A survey of two or more sites should be done to gather more information about preferred habitats for nesting, identify predators, determine average date of emergence, and make recommendations for improving nesting success.

2. Conduct a mark-recapture study of several established sites across the range in Pennsylvania would assist in identifying the density, age-class distribution, and reproductive success of the redbelly in Pennsylvania. Studies should be designed in a manner that can be repeated or adapted for long-term monitoring.

SURVEY NEEDS

1. Continue distributional survey efforts: Inventory resources should be spent following-up on reported eastern redbelly turtle sightings and examining habitats within the range to establish the present distribution of the eastern redbelly turtle in Pennsylvania.

MONITORING PROGRAMS

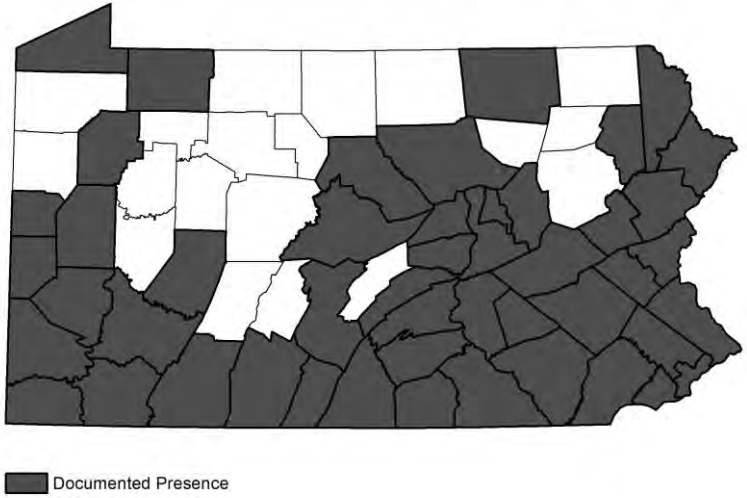
Program Name	Lead Agency	Hyperlink	Description
Periodic monitoring of basking structure use by redbelly turtles.	Pennsylvania Fish and Boat Commission		The PFBC Habitat Lake Section monitors the structures and their use in lakes across the range where structures have been placed by PFBC.

Eastern Box Turtle

Terrapene carolina carolina

Chris Urban, Kathy Gipe, Brandon Ruhe
PA Fish & Boat Commission, Western Pennsylvania Conservancy,
The Mid-Atlantic Center for Herpetology and Conservation.

Photo: Tom Diez



CONSERVATION PROFILE

Global Rank	**G5T5**	State Rank	**S3S4**
IUCN Red List	**VU Vulnerable**	PA Legal Status	**Not Listed**
Northeast Region	**Very High Concern / Low Responsibility**	PA Abundance	**Unknown**
Federal Status	**Not Listed**	PA Short-Term Trend (10 year)	**Decline of 11 - 40%**

Conservation Goal:

Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	**Central Oak-Pine**	
Habitat	**Northeastern Interior Dry-Mesic Oak Forest**	

Specific Habitat Requirements:

Deciduous forests, old fields, ecotonal areas, and marshy areas.

THREATS AND ACTIONS

IUCN Threat: 5.0 Biological Resource Use

Specific Threat: Poaching.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 7.0 Law enforcement Instruct all new officers (new officer classes) and update experienced officers in anti-poaching (once every 5 years).	Train and support law enforcement in anti-poaching efforts.	Number of trainings.	Determine officer readiness through tests at the end of training.	1

Action Location: Physiographic Province: Statewide

Associated Species: All native amphibian and reptile species, especially those deemed vulnerable to the black market trade.

IUCN Threat: 1.0 Residential and Commercial Development

Specific Threat: Habitat loss and fragmentation through residential and commercial development.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Conduct targeted surveys across their range.	Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.	Number of blocks surveyed (PARS).	PARS annual report of activities.	3

Action Location: Physiographic Province: Statewide

IUCN Threat: 4.0 Transportation and Service Corridors

Specific Threat: Roads fragment habitats and disrupt movement corridors (roadkill).

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Conduct targeted surveys across their range.	Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.	Number of blocks surveyed (PARS).	PARS annual report of activities.	3

Action Location: Physiographic Province: Statewide

RESEARCH NEEDS

SURVEY NEEDS

1. Conduct targeted surveys across their range.

MONITORING PROGRAMS

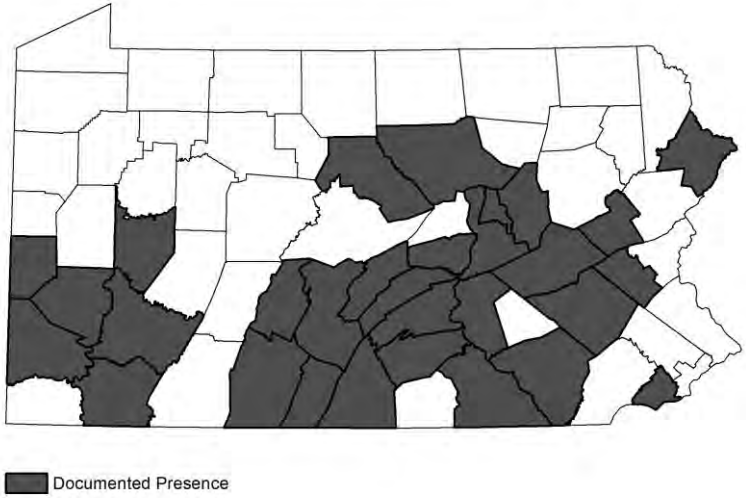
Program Name	Lead Agency	Hyperlink	Description
No Current Monitoring Programs			

Eastern Fence Lizard

Sceloporus undulatus

Chris Urban, Kathy Gipe, Brandon Ruhe
PA Fish & Boat Commission, Western Pennsylvania Conservancy,
The Mid-Atlantic Center for Herpetology and Conservation.

Photo: Ken Thomas



CONSERVATION PROFILE

Global Rank	**G5 Secure**	State Rank	**S3**
IUCN Red List	**LC Least Concern**	PA Legal Status	**Not Listed**
Northeast Region	**Not NE Regional SGCN**	PA Abundance	**Unknown**
Federal Status	**Not Listed**	PA Short-Term Trend (10 year)	**Unknown**

Conservation Goal:

Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	**Central Oak-Pine**	**Cliff and Talus**
Habitat	**Central Appalachian Dry Oak-Pine Forest**	**North-Central Appalachian Acidic Cliff and Talus**

Specific Habitat Requirements:

Open rock faces and talus in forest.

THREATS AND ACTIONS

IUCN Threat: 0.0 Unknown/undetermined

Specific Threat: Unknown/undetermined

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Conduct targeted surveys across their range.	Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.	Number of blocks surveyed (PARS).	PARS annual report of activities.	3

Action Location: Physiographic Province: Statewide

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. Conduct targeted surveys across their range.

MONITORING PROGRAMS

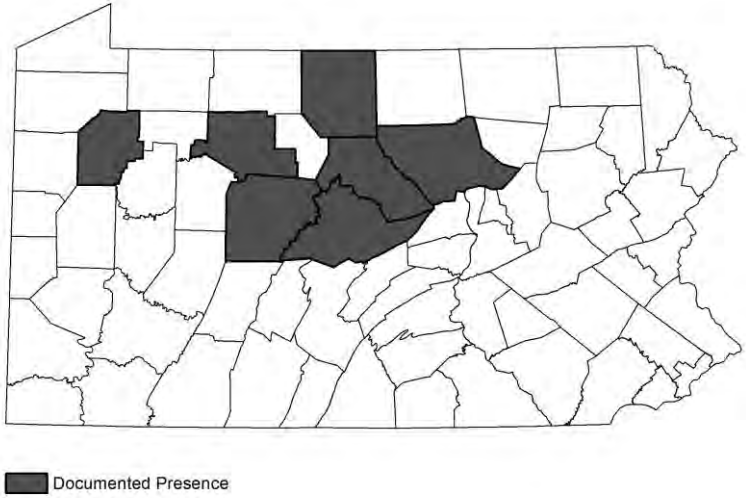
Program Name	Lead Agency	Hyperlink	Description
No Current Monitoring Programs			

Northern Coal Skink

Plestiodon anthracinus anthracinus

Chris Urban, Kathy Gipe, Brandon Ruhe
PA Fish & Boat Commission, Western Pennsylvania Conservancy,
The Mid-Atlantic Center for Herpetology and Conservation.

Photo: Jackie Carey



CONSERVATION PROFILE

Global Rank	**G5T5**	State Rank	**S3**
IUCN Red List	**LC Least Concern**	PA Legal Status	**Not Listed**
Northeast Region	**Very High Concern / High Responsibility**	PA Abundance	**Unknown**
Federal Status	**Not Listed**	PA Short-Term Trend (10 year)	**Relatively Stable (<=10% change)**

Conservation Goal:

Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	**Northern Hardwood & Conifer**	**Central Oak-Pine**
Habitat	**Appalachian (Hemlock)-Northern Hardwood Forest**	**Central Appalachian Dry Oak-Pine Forest**

Specific Habitat Requirements:

Open habitat (less than 50 percent canopy cover by trees) where rocks and logs provide abundant cover.

THREATS AND ACTIONS

IUCN Threat: 0.0 Unknown/undetermined

Specific Threat: Unknown/undetermined

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Conduct targeted surveys across their range.	Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.	Number of blocks surveyed (PARS).	PARS annual report of activities.	3

Action Location: Physiographic Province: Appalachian Plateaus, Ridge and Valley

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. Conduct targeted surveys across their range.

MONITORING PROGRAMS

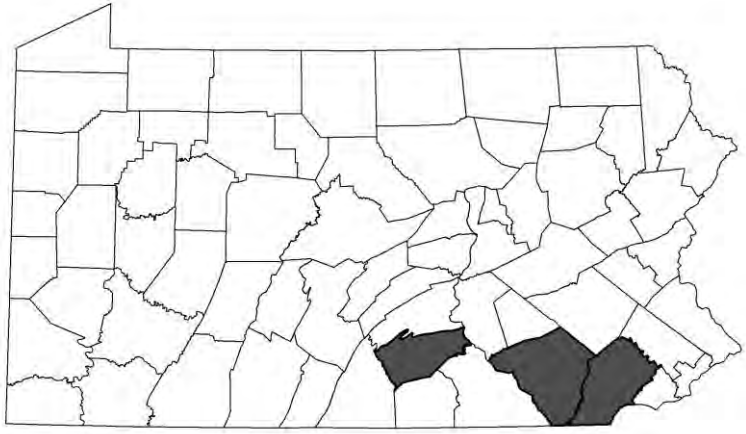
Program Name	Lead Agency	Hyperlink	Description
No Current Monitoring Programs			

Broadhead Skink

Plestiodon laticeps

Chris Urban, Kathy Gipe, Brandon Ruhe
PA Fish & Boat Commission, Western Pennsylvania Conservancy,
The Mid-Atlantic Center for Herpetology and Conservation.

Photo: Tom Diez



Documented Presence

CONSERVATION PROFILE

Global Rank	**G5 Secure**	State Rank	**S2**
IUCN Red List	**LC Least Concern**	PA Legal Status	**Candidate**
Northeast Region	**High Concern / Low Responsibility**	PA Abundance	**Unknown**
Federal Status	**Not Listed**	PA Short-Term Trend (10 year)	**Relatively Stable (<=10% change)**

Conservation Goal:

Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	**Central Oak-Pine**	
Habitat	**Northeastern Interior Dry-Mesic Oak Forest**	

Specific Habitat Requirements:

Deciduous forests with an abundance of dead standing timber, large stumps, and hollow logs.

THREATS AND ACTIONS

IUCN Threat: 4.0 Transportation and Service Corridors

Specific Threat: Roads fragment habitats, create corridors for invasive species spread, disrupt movement corridors, and alter site microclimate. Utility line maintenance causes mortality from pesticides and heavy equipment use.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 1.0 Coordination and Administration Consult with utlitlity company to help guide Right-Of-Way (ROW) habitat management. Action Location: Physiographic Province: Piedmont	To prevent improper ROW management.	Number of sites properly managed for species.	Assess habitat of occupied sites every five years.	2

IUCN Threat: 1.0 Residential and Commercial Development

Specific Threat: Illegal collecting.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Conduct targeted surveys across their range. Action Location: Physiographic Province: Piedmont	Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.	Number of blocks surveyed (PARS).	PARS annual report of activities.	3

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. Conduct targeted surveys across their range.

MONITORING PROGRAMS

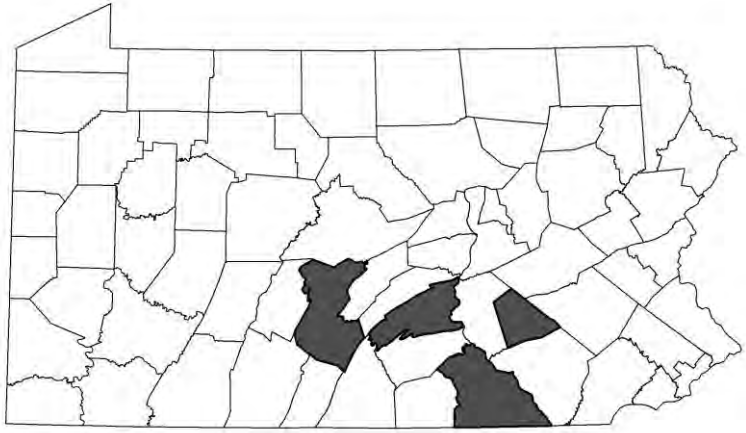
Program Name	Lead Agency	Hyperlink	Description
No Current Monitoring Programs			

Eastern Worm Snake

Carphophis amoenus amoenus

Chris Urban, Kathy Gipe, Brandon Ruhe
PA Fish & Boat Commission, Western Pennsylvania Conservancy,
The Mid-Atlantic Center for Herpetology and Conservation.

Photo: Tom Diez



Documented Presence

CONSERVATION PROFILE

Global Rank	**G5T5**	State Rank	**S2**
IUCN Red List	**LC Least Concern**	PA Legal Status	**Not Listed**
Northeast Region	**Not NE Regional SGCN**	PA Abundance	**Unknown**
Federal Status	**Not Listed**	PA Short-Term Trend (10 year)	**Unknown**

Conservation Goal:

Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	**Central Oak-Pine**	
Habitat	**Northeastern Interior Dry-Mesic Oak Forest**	

Specific Habitat Requirements:

Moist forests and early successional habitats with soft or sandy soils suitable for burrowing (Hulce et al. 2001).

THREATS AND ACTIONS

IUCN Threat: 0.0 Unknown/undetermined

Specific Threat: Unknown/undetermined

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Conduct targeted surveys across their range.	Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.	Number of blocks surveyed (PARS).	PARS annual report of activities.	3

Action Location: Physiographic Province: Ridge and Valley

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. Conduct targeted surveys across their range.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
No Current Monitoring Programs			

Kirtland's Snake

Clonophis kirtlandii

Chris Urban, Kathy Gipe, Brandon Ruhe
PA Fish & Boat Commission, Western Pennsylvania Conservancy,
The Mid-Atlantic Center for Herpetology and Conservation.

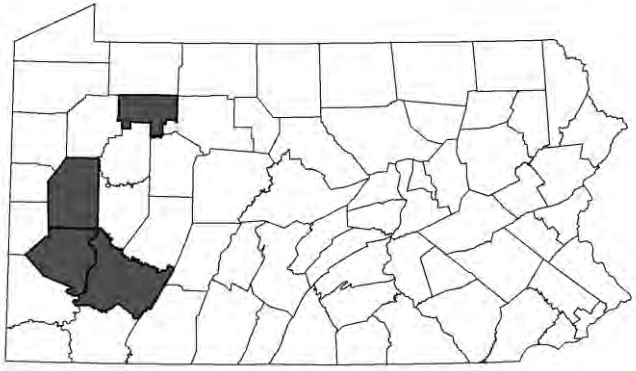
Photo: Tom Diez

CONSERVATION PROFILE

Global Rank	**G2 Imperiled**	State Rank	**SH**
IUCN Red List	**NT Near Threatened**	PA Legal Status	**Endangered**
Northeast Region	**Not NE Regional SGCN**	PA Abundance	**Unknown**
Federal Status	**Not Listed**	PA Short-Term Trend (10 year)	

Conservation Goal:

Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.



Documented Presence

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	**Northern Hardwood & Conifer**	
Habitat	**South-Central Interior Mesophytic Forest**	

Specific Habitat Requirements:

Damp vacant lots with debris for cover; open, damp woods/grassy areas in urban/suburban areas; prairie wetlands, wet meadows, grassy edges of creeks, streams, and ponds and relatively open, wet woods (often in urban/suburban settings) with crayfish burrows.

THREATS AND ACTIONS

IUCN Threat: 0.0 Unknown/undetermined

Specific Threat: Unknown/undetermined

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Conduct targeted surveys across their range.	Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.	Number of blocks surveyed (PARS).	PARS annual report of activities.	3

Action Location: Physiographic Province: Appalachian Plateaus

RESEARCH NEEDS

1. In the event that a population is discovered in Pennsylvania, a radio telemetry study should immediately occur to focus on habitat delineation and use and a population estimate.

SURVEY NEEDS

1. Conduct targeted surveys across their range.

2. Conduct thorough presence and inferred absence surveys of historical sites using survey protocol soon developed by USFWS.

MONITORING PROGRAMS

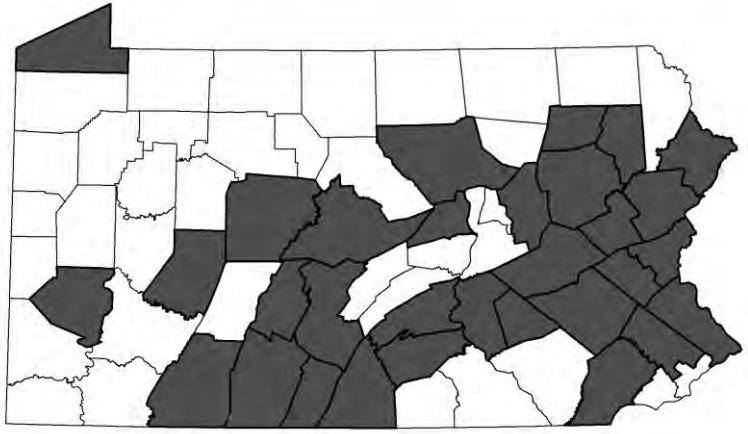
Program Name	Lead Agency	Hyperlink	Description
No Current Monitoring Programs			

Eastern Hognose Snake

Heterodon platirhinos

Chris Urban, Kathy Gipe, Brandon Ruhe
PA Fish & Boat Commission, Western Pennsylvania Conservancy,
The Mid-Atlantic Center for Herpetology and Conservation.

Photo: Tom Diez



Documented Presence

CONSERVATION PROFILE

Global Rank	**G5 Secure**	State Rank	**S3S4**
IUCN Red List	**LC Least Concern**	PA Legal Status	**Not Listed**
Northeast Region	**Very High Concern / Low Responsibility**	PA Abundance	**Unknown**
Federal Status	**Not Listed**	PA Short-Term Trend (10 year)	**Relatively Stable (<=10% change)**

Conservation Goal:

Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	**Central Oak-Pine**	**Central Oak-Pine**
Habitat	**Northeastern Interior Dry-Mesic Oak Forest**	**Central Appalachian Dry Oak-Pine Forest**

Specific Habitat Requirements:

Sandy clearings in forests and grasslands. Often associated with sandy floodplains along waterways.

THREATS AND ACTIONS

IUCN Threat: 5.0 Biological Resource Use

Specific Threat: Poaching.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 7.0 Law enforcement Instruct all new officers (new officer classes) and update experienced officers in anti-poaching (once every 5 years).	Train and support law enforcement in anti-poaching efforts.	Number of trainings.	Determine officer readiness through tests at the end of training.	1

Action Location: Physiographic Province: Appalachian Plateaus, Ridge and Valley

Associated Species: All native amphibian and reptile species, especially those deemed vulnerable to the black market trade.

IUCN Threat: 1.0 Residential and Commercial Development

Specific Threat: Habitat loss and fragmentation through residential and commercial development.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Conduct targeted surveys across their range.	Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.	Number of blocks surveyed (PARS).	PARS annual report of activities.	3

Action Location: Physiographic Province: Appalachian Plateaus, Ridge and Valley

THREATS AND ACTIONS

IUCN Threat: 4.0 Transportation and Service Corridors

Specific Threat: Roads fragment habitats, create corridors for invasive species spread, disrupt movement corridors.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Conduct targeted surveys across their range.	Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.	Number of blocks surveyed (PARS).	PARS annual report of activities.	3

Action Location: Physiographic Province: Appalachian Plateaus, Ridge and Valley

RESEARCH NEEDS

1. Radio telemetry study focused on seasonal habitat use.

SURVEY NEEDS

1. Conduct targeted surveys across their range.

MONITORING PROGRAMS

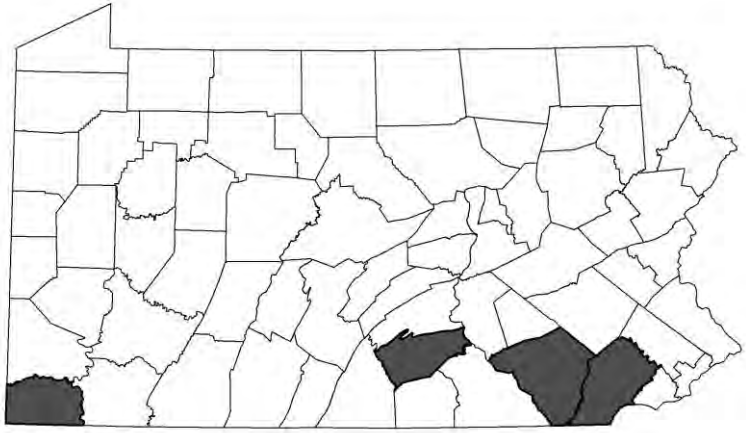
Program Name	Lead Agency	Hyperlink	Description
No Current Monitoring Programs			

Rough Green Snake

Opheodrys aestivus

Chris Urban, Kathy Gipe, Brandon Ruhe
PA Fish & Boat Commission, Western Pennsylvania Conservancy,
The Mid-Atlantic Center for Herpetology and Conservation.

Photo: Tom Diez



Documented Presence

CONSERVATION PROFILE

Global Rank	**G5 Secure**	State Rank	**S1S2**
IUCN Red List	**LC Least Concern**	PA Legal Status	**Endangered**
Northeast Region	**High Concern / Low Responsibility**	PA Abundance	**Unknown**
Federal Status	**Not Listed**	PA Short-Term Trend (10 year)	**Relatively Stable (<=10% change)**

Conservation Goal:

Protect and maintain known rough green snake populations.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	**Glade, Barren and Savanna**	**Central Oak-Pine**
Habitat	**Eastern Serpentine Woodland**	**Northeastern Interior Dry-Mesic Oak Forest**

Specific Habitat Requirements:

Riparian thickets and lake shores where trees or woody shrubs (1-3 meters in height) dominate the vegetation.

THREATS AND ACTIONS

IUCN Threat: 1.0 Residential and Commercial Development

Specific Threat: Habitat loss and fragmentation through residential and commercial development.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Continue consultations with developers to protect species habitats and incorporate habitat management into plans. Proactive land protection would also be beneficial. Action Location: Physiographic Province: Piedmont Associated Species: Smooth earth snake.	To prevent development related impacts to rough green snake populations.	Number of consultations that protect rough green snake habitat.	Spot-check 25% of projects to confirm adherence to recommended mitigation actions.	1

IUCN Threat: 4.0 Transportation and Service Corridors

Specific Threat: Roads fragment habitats, create corridors for invasive species spread, disrupt movement corridors.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Continue consultations with developers to protect species habitats and incorporate habitat management into plans. Proactive land protection would also be beneficial. Action Location: Physiographic Province: Piedmont Associated Species: Smooth earth snake.	To prevent development related impacts to rough green snake populations.	Number of consultations that protect rough green snake habitat.	Spot-check 25% of projects to confirm adherence to recommended mitigation actions.	1

THREATS AND ACTIONS

IUCN Threat: 1.0 Residential and Commercial Development

Specific Threat: Sites on public lands managed for recreation/ rare plants, in conflict with best management for this species

Action	Objective	Measure	Monitoring	Priority
TRACS Action 1.0 Coordination and Administration Coordinate with state and local partners to properly manage habitat. Action Location: Physiographic Province: Piedmont Associated Species: Smooth earth snake.	Propose management plans at all publicly owned rough green snake properties in the next 10 years.	Number of management plans finalized, acres of land under targeted management.	Prepare annual report on habitat managed, protected, and outreach events.	2

IUCN Threat: 4.0 Transportation and Service Corridors

Specific Threat: Utility line maintenance causes mortality from pesticides and heavy equipment use.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 1.0 Coordination and Administration Consult with utlitlity company to help guide Right-Of-Way (ROW) habitat management. Action Location: Physiographic Province: Piedmont Associated Species: Smooth earth snake.	To prevent improper ROW management .	Number of sites properly managed for species.	Assess habitat of occupied sites every five years.	2

THREATS AND ACTIONS

IUCN Threat: 5.0 Biological Resource Use

Specific Threat: Poaching.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 7.0 Law enforcement Instruct all new officers (new officer classes) and update experienced officers in anti-poaching (once every 5 years).	Train and support law enforcement in anti-poaching efforts.	Number of trainings.	Determine officer readiness through tests at the end of training.	2

Action Location: Physiographic Province: Piedmont

Associated Species: All native amphibian and reptile species, especially those deemed vulnerable to the black market trade.

IUCN Threat: 7.0 Natural System Modifications

Specific Threat: Habitat succession to closed canopy oak/hickory forest.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 1.0 Coordination and Administration Coordinate with state and local partners to properly manage habitat.	Propose management plans at all publicly owned rough green snake properties in the next 10 years.	Number of management plans finalized, acres of land under targeted management.	Prepare annual report on habitat managed, protected, and outreach events.	2

Action Location: Physiographic Province: Piedmont

Associated Species: Smooth earth snake.

RESEARCH NEEDS

1. Conduct a radio telemetry study focused on habitat delineation and use; the primary published literature on habitat use by this species is from Arkansas and appears very different from what has been observed in PA.

SURVEY NEEDS

1. Survey and develop population estimates at known sites.

2. Continued survey for the species within the known range in Pennsylvania.

MONITORING PROGRAMS

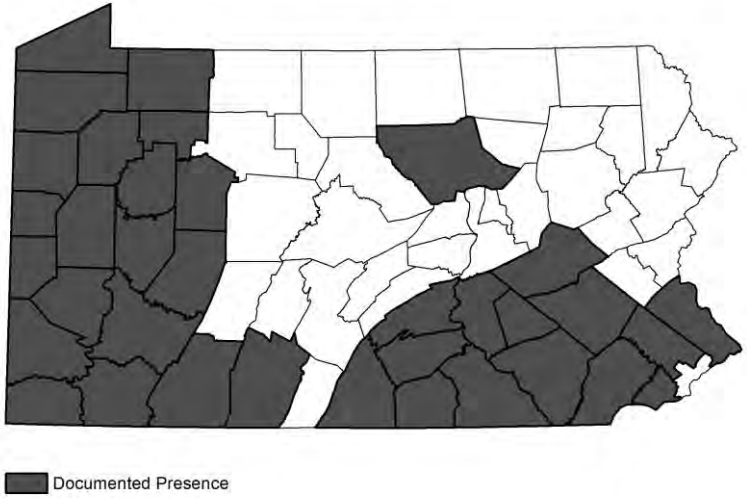
Program Name	Lead Agency	Hyperlink	Description
No Current Monitoring Programs			

Queen Snake

Regina septemvittata

Chris Urban, Kathy Gipe, Brandon Ruhe
PA Fish & Boat Commission, Western Pennsylvania Conservancy,
The Mid-Atlantic Center for Herpetology and Conservation.

Photo: Tom Diez



CONSERVATION PROFILE

Global Rank	**G5 Secure**	State Rank	**S3S4**
IUCN Red List	**LC Least Concern**	PA Legal Status	**Not Listed**
Northeast Region	**Very High Concern / Low Responsibility**	PA Abundance	**Unknown**
Federal Status	**Not Listed**	PA Short-Term Trend (10 year)	**Relatively Stable (<=10% change)**

Conservation Goal:

Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	**Northern Hardwood & Conifer**	**Northern Hardwood & Conifer**
Habitat	**Appalachian (Hemlock)-Northern Hardwood Forest**	**South-Central Interior Mesophytic Forest**

Specific Habitat Requirements:

Descriptions of the habitat of this species are fairly variable and include small, shallow streams, rivers, lakes, and marshes (Conant 1960; Ernst & Ernst 2003; Gibbons & Dorcas 2004).

THREATS AND ACTIONS

IUCN Threat: 1.0 Residential and Commercial Development

Specific Threat: Habitat loss and fragmentation through residential and commercial development.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.	Conduct targeted surveys across their range.	Number of blocks surveyed (PARS).	PARS annual report of activities.	3

Action Location: Physiographic Province: Piedmont, Ridge and Valley, Appalachian Plateaus, Central Lowland

IUCN Threat: 7.0 Natural System Modifications

Specific Threat: Succession from shrub and emergent stream banks to closed canopy eliminates basking habitats particularly for gravid females.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.	Conduct targeted surveys across their range.	Number of blocks surveyed (PARS).	PARS annual report of activities.	3

Action Location: Physiographic Province: Piedmont, Ridge and Valley, Appalachian Plateaus, Central Lowland

THREATS AND ACTIONS

IUCN Threat: 9.0 Pollution

Specific Threat: Environmental pollutants and diseases cause mortality and disrupt reproductive cycle.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.	Conduct targeted surveys across their range.	Number of blocks surveyed (PARS).	PARS annual report of activities.	3

Action Location: Physiographic Province: Piedmont, Ridge and Valley, Appalachian Plateaus, Central Lowland

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. Conduct targeted surveys across their range.

MONITORING PROGRAMS

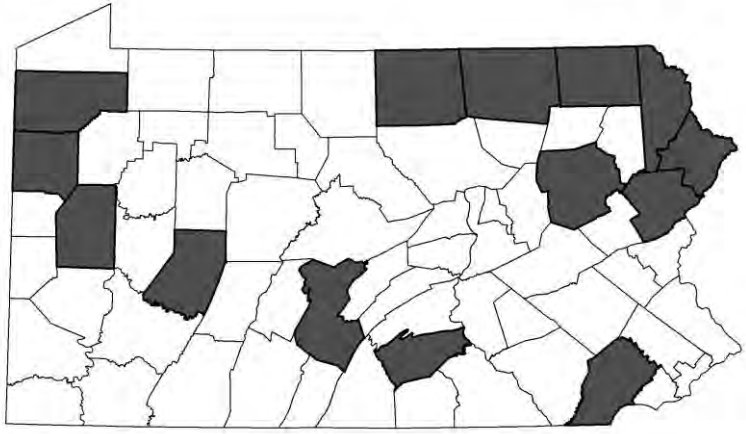
Program Name	Lead Agency	Hyperlink	Description
No Current Monitoring Programs			

Eastern Ribbonsnake

Thamnophis sauritus

Chris Urban, Kathy Gipe, Brandon Ruhe
PA Fish & Boat Commission, Western Pennsylvania Conservancy,
The Mid-Atlantic Center for Herpetology and Conservation.

Photo: Tom Diez



Documented Presence

CONSERVATION PROFILE

Global Rank	**G5T5**	State Rank	**S3**
IUCN Red List	**LC Least Concern**	PA Legal Status	**Not Listed**
Northeast Region	**Very High Concern / Low Responsibility**	PA Abundance	**Unknown**
Federal Status	**Not Listed**	PA Short-Term Trend (10 year)	**Relatively Stable (<=10% change)**

Conservation Goal:

Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	**Central Oak-Pine**	**Northern Hardwood & Conifer**
Habitat	**Northeastern Interior Dry-Mesic Oak Forest**	**Appalachian (Hemlock)-Northern Hardwood Forest**

Specific Habitat Requirements:

Riparian edges of emergent marshes, bogs, streams, rivers, ponds and lakes with with dense sedges, grasses, rushes, and emergent shrubs, and lots of frogs.

THREATS AND ACTIONS

IUCN Threat: 0.0 Unknown/undetermined

Specific Threat: Unknown/undetermined

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.	Conduct targeted surveys across their range.	Number of blocks surveyed (PARS).	PARS annual report of activities.	3

Action Location: Physiographic Province: Piedmont, Ridge and Valley, Appalachian Plateaus, Central Lowland

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. Conduct targeted surveys across their range.

MONITORING PROGRAMS

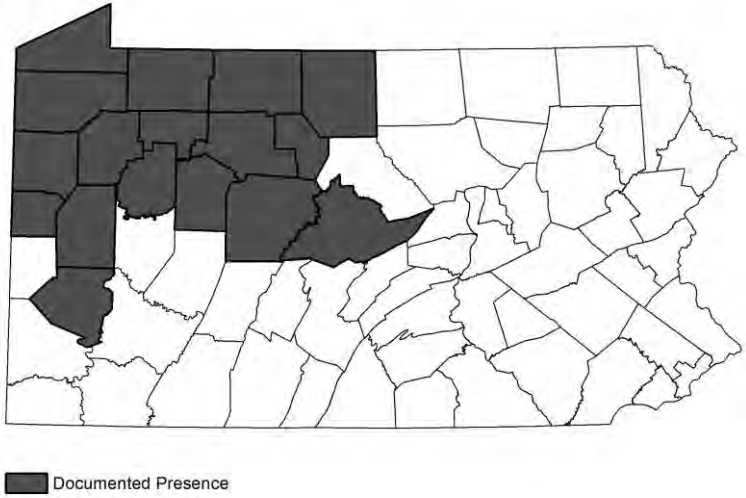
Program Name	Lead Agency	Hyperlink	Description
No Current Monitoring Programs			

Shorthead Garter Snake

Thamnophis brachystoma

Chris Urban, Kathy Gipe, Brandon Ruhe
PA Fish & Boat Commission, Western Pennsylvania Conservancy,
The Mid-Atlantic Center for Herpetology and Conservation.

Photo: Tom Diez



CONSERVATION PROFILE

Global Rank	**G4 Apparently secur**	State Rank	**S4**
IUCN Red List	**LC Least Concern**	PA Legal Status	**Not Listed**
Northeast Region	**Low Concern / High Responsibility**	PA Abundance	**Unknown**
Federal Status	**Not Listed**	PA Short-Term Trend (10 year)	**Relatively Stable (<=10% change)**

Conservation Goal:

Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	**Wet Meadow / Shrub Marsh**	**Cliff and Talus**
Habitat	**Laurentian-Acadian Wet Meadow-Shrub Swamp**	**North-Central Appalachian Acidic Cliff and Talus**

Specific Habitat Requirements:

Riparian old fields and meadows with grasses, sedges, low herbaceous growth, and early successional perennials.

THREATS AND ACTIONS

IUCN Threat: 0.0 Unknown/undetermined

Specific Threat: Unknown/undetermined

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.	Conduct targeted surveys across their range.	Number of blocks surveyed (PARS).	PARS annual report of activities.	3

Action Location: Physiographic Province: Appalachian Plateaus

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. Conduct targeted surveys across their range.

MONITORING PROGRAMS

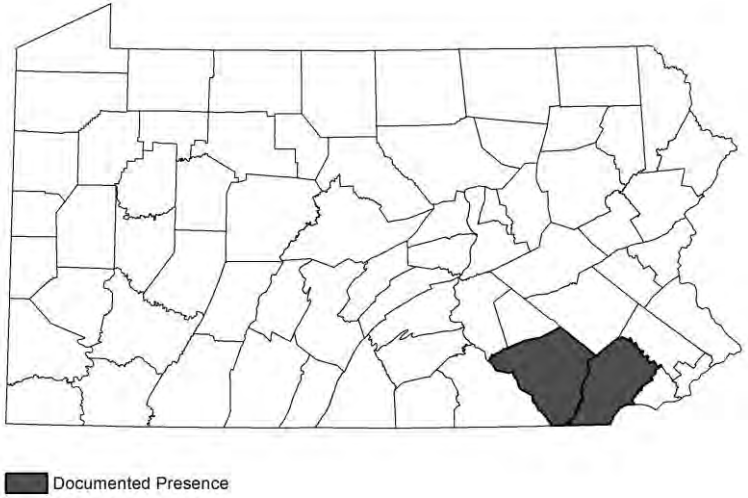
Program Name	Lead Agency	Hyperlink	Description
No Current Monitoring Programs			

Eastern Smooth Earth Snake

Virginia valeriae valeriae

Chris Urban, Kathy Gipe, Brandon Ruhe
PA Fish & Boat Commission, Western Pennsylvania Conservancy,
The Mid-Atlantic Center for Herpetology and Conservation.

Photo: USGS



CONSERVATION PROFILE

Global Rank	**G5T5**	State Rank	**SH**
IUCN Red List	**LC Least Concern**	PA Legal Status	**Not Listed**
Northeast Region	**Not NE Regional SGCN**	PA Abundance	**Unknown**
Federal Status	**Not Listed**	PA Short-Term Trend (10 year)	

Conservation Goal:

Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	**Glade, Barren and Savanna**	
Habitat	**Eastern Serpentine Woodland**	

Specific Habitat Requirements:

Deciduous forests and adjacent open areas.

THREATS AND ACTIONS

IUCN Threat: 0.0 Unknown/undetermined

Specific Threat: Unknown/undetermined

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines. Action Location: Physiographic Province: Piedmont	Conduct targeted surveys across their range.	Number of blocks surveyed (PARS).	PARS annual report of activities.	3

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. Conduct targeted surveys across their range.

MONITORING PROGRAMS

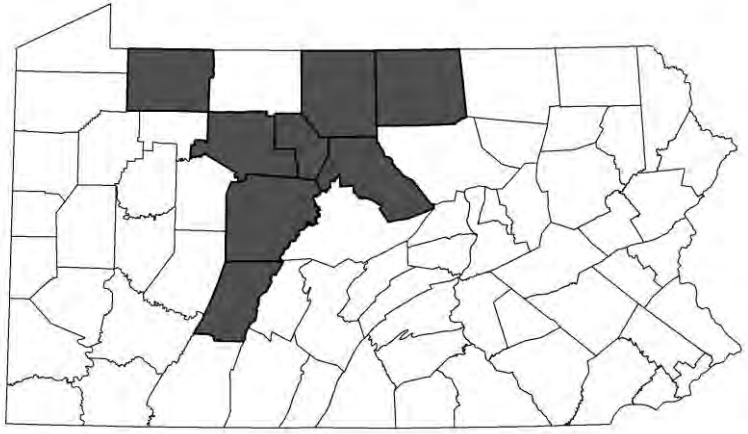
Program Name	Lead Agency	Hyperlink	Description
No Current Monitoring Programs			

Mountain Earth Snake

Virginia valeriae pulchra

Chris Urban, Kathy Gipe, Brandon Ruhe
PA Fish & Boat Commission, Western Pennsylvania Conservancy,
The Mid-Atlantic Center for Herpetology and Conservation.

Photo: Tom Diez



Documented Presence

CONSERVATION PROFILE

Global Rank	**G5T3T4**	State Rank	**S3**
IUCN Red List		PA Legal Status	**Not Listed**
Northeast Region	**< 4 States / High Responsibility**	PA Abundance	**Unknown**
Federal Status	**Not Listed**	PA Short-Term Trend (10 year)	**Relatively Stable (<=10% change)**

Conservation Goal:

Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	**Cliff and Talus**	**Central Oak-Pine**
Habitat	**North-Central Appalachian Acidic Cliff and Talus**	**Northeastern Interior Dry-Mesic Oak Forest**

Specific Habitat Requirements:

Deciduous/mixed forests; moderate to steep hillsides with an abundance of rocky cover and vegetation.

THREATS AND ACTIONS

IUCN Threat: 0.0 Unknown/undetermined

Specific Threat: Unknown/undetermined

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.	Conduct targeted surveys across their range.	Number of blocks surveyed (PARS).	PARS annual report of activities.	3

Action Location: Physiographic Province: Appalachian Plateaus

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. Conduct targeted surveys across their range.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
No Current Monitoring Programs			

Copperhead

Agkistrodon contortrix

Chris Urban, Kathy Gipe, Brandon Ruhe
PA Fish & Boat Commission, Western Pennsylvania Conservancy,
The Mid-Atlantic Center for Herpetology and Conservation.

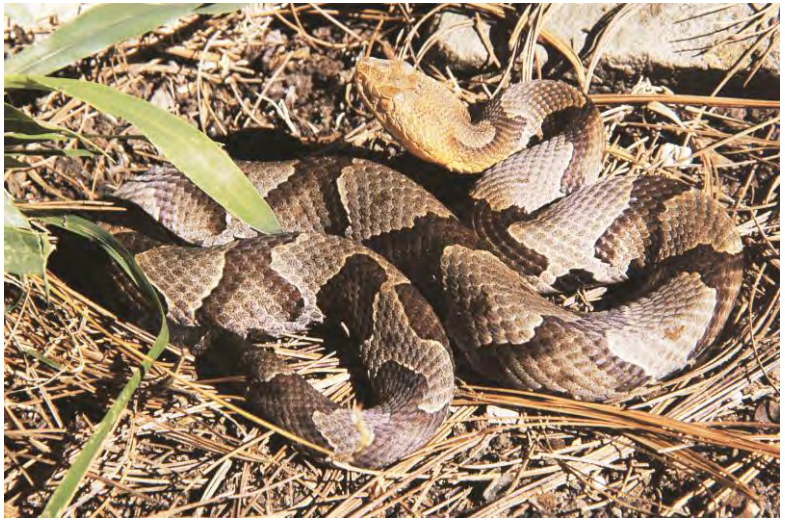
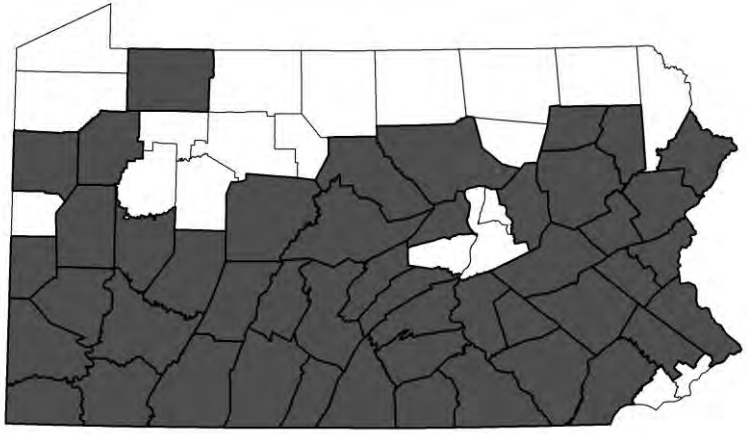


Photo: Tom Diez



Documented Presence

CONSERVATION PROFILE

Global Rank	**G5 Secure**	State Rank	**S3S4**
IUCN Red List	**LC Least Concern**	PA Legal Status	**Not Listed**
Northeast Region	**High Concern / Low Responsibility**	PA Abundance	**Unknown**
Federal Status	**Not Listed**	PA Short-Term Trend (10 year)	**Relatively Stable (<=10% change)**

Conservation Goal:

Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	**Central Oak-Pine**	**Central Oak-Pine**
Habitat	**Central Appalachian Dry Oak-Pine Forest**	**Central Appalachian Pine-Oak Rocky Woodland**

Specific Habitat Requirements:

Open, rocky areas in deciduous hardwood forest with low surface vegetation, reduced amounts of shade, and soil temperatures elevated by sunlight.

THREATS AND ACTIONS

IUCN Threat: 5.0 Biological Resource Use

Specific Threat: Excessive collection, poaching, wanton killing.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 7.0 Law enforcement Instruct all new officers (new officer classes) and update experienced officers in anti-poaching (once every 5 years).	Train and support law enforcement in anti-poaching efforts.	Number of trainings.	Determine officer readiness through tests at the end of training.	1

Action Location: Physiographic Province: Appalachian Plateaus, Piedmont, Ridge and Valley

Associated Species: All native amphibian and reptile species, especially those deemed vulnerable to the black market trade.

IUCN Threat: 1.0 Residential and Commercial Development

Specific Threat: Habitat loss and fragmentation through residential and commercial development.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.	Conduct targeted surveys across their range.	Number of blocks surveyed (PARS).	PARS annual report of activities.	3

Action Location: Physiographic Province: Appalachian Plateaus, Piedmont, Ridge and Valley

THREATS AND ACTIONS

IUCN Threat: 4.0 Transportation and Service Corridors

Specific Threat: Roads fragment habitats, create corridors for invasive species spread, disrupt movement corridors (roadkill).

Action		Objective	Measure	Monitoring	Priority
TRACS Action 9.0	Planning	Conduct targeted surveys across their range.	Number of blocks surveyed (PARS).	PARS annual report of activities.	3

Improve knowledge of distribution and population parameters in order to establish conservation and management actions that will prevent further declines.

Action Location: Physiographic Province: Appalachian Plateaus, Piedmont, Ridge and Valley

RESEARCH NEEDS

1. None

SURVEY NEEDS

1. Conduct targeted surveys across their range.

MONITORING PROGRAMS

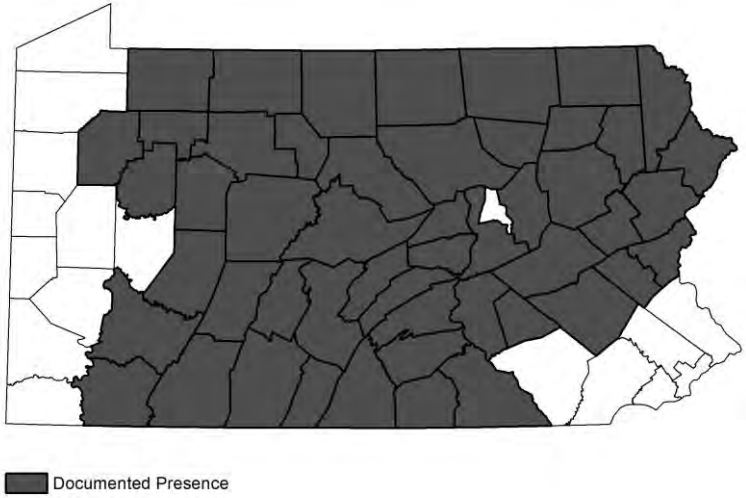
Program Name	Lead Agency	Hyperlink	Description
No Current Monitoring Programs			

Timber Rattlesnake

Crotalus horridus

Chris Urban, Kathy Gipe, Brandon Ruhe
PA Fish & Boat Commission, Western Pennsylvania Conservancy,
The Mid-Atlantic Center for Herpetology and Conservation.

Photo: Tom Diez



CONSERVATION PROFILE

Global Rank	**G4 Apparently secur**	State Rank	**S3S4**
IUCN Red List	**LC Least Concern**	PA Legal Status	**Candidate**
Northeast Region	**Very High Concern / Low Responsibility**	PA Abundance	**Unknown**
Federal Status	**Not Listed**	PA Short-Term Trend (10 year)	**Relatively Stable (<=10% change)**

Conservation Goal:

Protect and maintain known timber rattlesnake populations; monitor status; recover populations on the periphery of their range.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	**Central Oak-Pine**	**Central Oak-Pine**
Habitat	**Central Appalachian Dry Oak-Pine Forest**	**Central Appalachian Pine-Oak Rocky Woodland**

Specific Habitat Requirements:

Sandstone and/or limestone rock habitats in unfragmented oak-hickory forest communities.

THREATS AND ACTIONS

IUCN Threat: 1.0 Residential and Commercial Development

Specific Threat: Habitat loss and fragmentation through residential and commercial development.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Continue consultations with developers to protect species habitats and incorporate habitat management into plans. Proactive land protection would also be beneficial.	To prevent development related impacts to timber rattlesnake populations.	Number of consultations that protect timber rattlesnake habitat.	Spot-check 25% of projects to confirm adherence to recommended actions.	1

Action Location: Physiographic Province: Appalachian Plateaus, Ridge and Valley

Associated Species: Copperhead, northern coal skink, eastern fence lizard.

IUCN Threat: 3.0 Energy Production and Mining

Specific Threat: Habitat loss and fragmentation from industrial development.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Continue consultations with developers to protect species habitats and incorporate habitat management into plans. Proactive land protection would also be beneficial.	To prevent development related impacts to timber rattlesnake populations.	Number of consultations that protect timber rattlesnake habitat.	Spot-check 25% of projects to confirm adherence to recommended actions.	1

Action Location: Physiographic Province: Appalachian Plateaus, Ridge and Valley

Associated Species: Copperhead, northern coal skink, eastern fence lizard.

THREATS AND ACTIONS

IUCN Threat: 4.0 Transportation and Service Corridors

Specific Threat: Roads fragment habitats, create corridors for invasive species spread, disrupt movement corridors (roadkill).

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Continue consultations with developers to protect species habitats and incorporate habitat management into plans. Proactive land protection would also be beneficial.	To prevent development related impacts to timber rattlesnake populations.	Number of consultations that protect timber rattlesnake habitat.	Spot-check 25% of projects to confirm adherence to recommended actions.	1

Action Location: Physiographic Province: Appalachian Plateaus, Ridge and Valley

Associated Species: Copperhead, northern coal skink, eastern fence lizard.

IUCN Threat: 5.0 Biological Resource Use

Specific Threat: Excessive collection, poaching, wanton killing.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 7.0 Law enforcement Instruct all new officers (new officer classes) and update experienced officers in anti-poaching (once every 5 years).	Train and support law enforcement in anti-poaching efforts.	Number of trainings.	Determine officer readiness through tests at the end of training.	1

Action Location: Physiographic Province: Appalachian Plateaus, Ridge and Valley

Associated Species: All native amphibian and reptile species, especially those deemed vulnerable to the black market trade.

RESEARCH NEEDS

1. Determine effects of fire management on the timber rattlesnake.

2. Assess potential for augmentation on peripheral populations.

SURVEY NEEDS

1. Identify priority sites in need of habitat management; implement habitat management.

2. Continue to assess gap areas for new sites (inventory).

MONITORING PROGRAMS

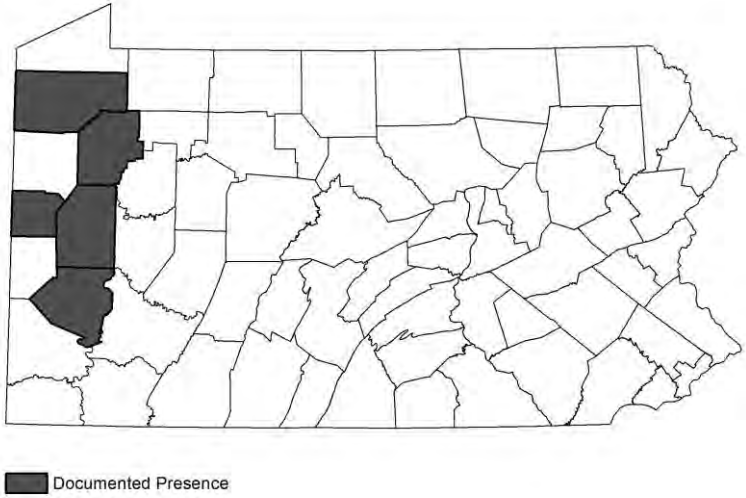
Program Name	Lead Agency	Hyperlink	Description
Monitoring of the Timber Rattlesnake in PA (under development).	Pennsylvania Fish and Boat Commission, East Stroudsburg University		Development of a statistically robust long-term monitoring program that incorporates long-term sites, and rapid assessment, and threats analysis.
PA Timber Rattlesnake Site Assessment and Inventory Project	Pennsylvania Fish and Boat Commission		Assessment of over 1000 timber rattlesnake den and gestation areas across PA. A subset of these sites (8) have long-term monitoring (mark-recapture).

Eastern Massasauga

Sistrurus catenatus catenatus

Chris Urban, Kathy Gipe, Brandon Ruhe
PA Fish & Boat Commission, Western Pennsylvania Conservancy,
The Mid-Atlantic Center for Herpetology and Conservation.

Photo: Andy Shiels



CONSERVATION PROFILE

Global Rank	**G3G4T3Q**	State Rank	**S1**
IUCN Red List	**LC Least Concern**	PA Legal Status	**Endangered**
Northeast Region	**Not NE Regional SGCN**	PA Abundance	**Unknown**
Federal Status	**Not Listed**	PA Short-Term Trend (10 year)	**Decline of 11 - 40%**

Conservation Goal:

Protect and maintain known eastern massasauga populations; plan for the reintroduction of eastern massasauga at suitable sites within their historically occupied range.

HABITAT ASSOCIATIONS

	Primary	Secondary
Macrogroup	**Northern Swamp**	**Wet Meadow / Shrub Marsh**
Habitat	**North-Central Appalachian Acidic Swamp**	**Laurentian-Acadian Wet Meadow-Shrub Swamp**

Specific Habitat Requirements:

Wetlands with surrounding old field and prairie habitats that contain sunny basking sites.

THREATS AND ACTIONS

IUCN Threat: 1.0 Residential and Commercial Development

Specific Threat: Improper habitat manipulation; wanton killing, poaching.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 1.0 Coordination and Administration Coordinate with state partners to properly manage habitat, inform the public about eastern massasauga conservation, reduce public access to sensitive areas, and increase law enforcement oversight.	Finalize management plans at all state-owned eastern massasauga properties in the next 5 years.	Number of management plans finalized, acres of land under targeted management.	State agencies report annually on habitat managed, protected, eastern massasauga outreach events, and visitor incidents.	1

Action Location: Physiographic Province: Appalachian Plateaus

Associated Species: Shorthead garter, American Woodcock, grassland birds.

IUCN Threat: 3.0 Energy Production and Mining

Specific Threat: Habitat loss and fragmentation through residential and commercial development.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Continue consultations with developers to protect species habitats and incorporate habitat management into plans. Proactive land protection would also be beneficial.	To prevent development related impacts to eastern massasauga populations.	Number of consultations that protect eastern massasauga habitat.	Spot-check 25% of projects to confirm adherence to recommended actions.	1

Action Location: Physiographic Province: Appalachian Plateaus

Associated Species: Shorthead garter, American Woodcock, grassland birds.

THREATS AND ACTIONS

IUCN Threat: 4.0 Transportation and Service Corridors

Specific Threat: Unchecked utility line and access road excavation and maintenace a threat.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Continue consultations with developers to protect species habitats and incorporate habitat management into plans. Proactive land protection would also be beneficial.	To prevent development related impacts to eastern massasauga populations.	Numbers of consultations that protect eastern massasauga habitat.	Spot-check 25% of projects to confirm adherence to recommended actions.	1

Action Location: Physiographic Province: Appalachian Plateaus

Associated Species: Shorthead garter, American Woodcock, grassland birds.

IUCN Threat: 5.0 Biological Resource Use

Specific Threat: Poaching.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 7.0 Law enforcement Instruct all new officers (new officer classes) and update experienced officers in anti-poaching (once every 5 years).	Train and support law enforcement in anti-poaching efforts.	Number of trainings.	Determine officer readiness through tests at the end of training.	1

Action Location: Physiographic Province: Appalachian Plateaus

Associated Species: All native amphibian and reptile species, especially those deemed vulnerable to the black market trade.

THREATS AND ACTIONS

IUCN Threat: 7.0 Natural System Modifications

Specific Threat: Loss of gestation habitat via forest succession.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Prioritize occupied sites undergoing succession, development management plan and implement habitat management.	To implement habitat management at 10 properties in 10 years.	Acres and/or number of sites managed.	Use a habitat assessment form to assess succession at each habitat managemet site once every 5 years.	1

Action Location: Physiographic Province: Appalachian Plateaus

Associated Species: Shorthead garter, American Woodcock, grassland birds.

IUCN Threat: 7.0 Natural System Modifications

Specific Threat: Hydrologic manipulation of wetlands destroys overwintering snakes and their habitat.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 1.0 Coordination and Administration Coordinate with state partners to properly manage habitat.	Finalize management plans at all state-owned eastern massasauga properties in the next 5 years.	Number of management plans finalized, acres of land under targeted management.	State agencies report annually on habitat managed.	1

Action Location: Physiographic Province: Appalachian Plateaus

Associated Species: Shorthead garter, American Woodcock, grassland birds.

THREATS AND ACTIONS

IUCN Threat: 1.0 Residential and Commercial Development

Specific Threat: Habitat loss and fragmentation through residential and commercial development.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 11.0 Technical Assistance Continue consultations with developers to protect species habitats and incorporate habitat management into plans. Proactive land protection would also be beneficial.	To prevent development related impacts to eastern massasauga populations.	Number of consultations that protect eastern massasauga habitat.	Spot-check 25% of projects to confirm adherence to recommended actions.	2

Action Location: Physiographic Province: Appalachian Plateaus

Associated Species: Shorthead garter, American Woodcock, grassland birds.

IUCN Threat: 2.0 Agriculture and Aquaculture

Specific Threat: Habitat loss and fragmentation from agricultural practices.

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning 1. Protect known eastern massasauga populations through land preservation (e.g., fee title acquisition, conservation easements, and conservation agreements). 2. Develop management plans addressing habitat maintenance and restoration for all sites harboring eastern massasauga populations.	Follow-up to discuss land protection options with landowners at the highest priority sites, which were established within the Protection Plan and Landownder Incentive Program (LIP) report.	Acres and/or number of sites with management and/or protection plans developed.	Spot-check 25% of projects to confirm adherence to recommended actions.	2

Action Location: Physiographic Province: Appalachian Plateaus

Associated Species: Shorthead garter, American Woodcock, grassland birds.

THREATS AND ACTIONS

IUCN Threat: 4.0 Transportation and Service Corridors

Specific Threat: Roads fragment habitats, create corridors for invasive species spread, disrupt movement corridors (roadkill).

Action	Objective	Measure	Monitoring	Priority
TRACS Action 9.0 Planning Design and implement wildlife crossings for travel corridors.	To reduce roadkills by installing 5 wildlife crossings (e.g., drift fence/culvert) in 10 years.	Number of crossings installed, number of roadkills.	Annual inspections of structure; use trailcams to monitor use of structures during active season; count annual roadkills.	2

Action Location: Physiographic Province: Appalachian Plateaus

Associated Species: Shorthead garter, American Woodcock, grassland birds.

RESEARCH NEEDS

1. Assess genetic structure of extant populations to determine the extent of population isolation, and its impact on gene flow and genetic diversity.

2. Develop reintroduction and augmentation protocols.

3. Determine effective captive propagation procedures.

SURVEY NEEDS

2. Perform intensive repeated surveys of historic and gap sites to assess the current presence of eastern massasauga and the condition of the habitat.

1. Develop and implement population monitoring protocol for extant sites.

3. Survey and develop population estimates at known sites.

MONITORING PROGRAMS

Program Name	Lead Agency	Hyperlink	Description
Assessment of the Impact of Habitat Restoration, Monitoring and Management Practices on the Eastern Massasauga Rattlesnake.	Pennsylvania Fish and Boat Commission, MACHAC		Monitoring of habitat use and population at two (2) properties in Venango County. (Tippery).

Reptiles

Eastern Mud Turtle

McCoy, C. J. 1982. Amphibians and reptiles in Pennsylvania: checklist, bibliography, and atlas of distribution. Carnegie Museum of Natural History Special Publication 6, Pittsburgh, Pennsylvania.

PARS (Pennsylvania Amphibian and Reptile Survey). 2015. Website. Available from http://www.paherpsurvey.org (accessed July 2015).

PFBC (Pennsylvania Fish and Boat Commission). 2011. Amphibian and Reptile Status Change Documentation Form: Eastern Mud Turtle. Harrisburg, Pennsylvania.

Ruhe, B. M., and T. C. LaDuke. 2011. Status Assessment and Range Determination of the Eastern Mud Turtle (*Kinosternon subrubrum subrubrum*) in Pennsylvania. Pennsylvania Fish and Boat Commission Report.

Spotted Turtle

McCoy, C. J. 1982. Amphibians and reptiles in Pennsylvania: checklist, bibliography, and atlas of distribution. Carnegie Museum of Natural History Special Publication 6, Pittsburgh, Pennsylvania.

PARS (Pennsylvania Amphibian and Reptile Survey). 2015. Website. Available from http://www.paherpsurvey.org (accessed July 2015).

Wood Turtle

Jones, M. T., L. I. Willey, P. R. Sievert, and T. S. Akre. 2013. Status and Conservation of the Wood Turtle in the Northeastern United States. Unpublished report to the Northeast Regional Conservation Needs Program.

McCoy, C. J. 1982. Amphibians and reptiles in Pennsylvania: checklist, bibliography, and atlas of distribution. Carnegie Museum of Natural History Special Publication 6, Pittsburgh, Pennsylvania.

PARS (Pennsylvania Amphibian and Reptile Survey). 2015. Website. Available from http://www.paherpsurvey.org (accessed July 2015).

Bog Turtle

McCoy, C. J. 1982. Amphibians and reptiles in Pennsylvania: checklist, bibliography, and atlas of distribution. Carnegie Museum of Natural History Special Publication 6, Pittsburgh, Pennsylvania.

PARS (Pennsylvania Amphibian and Reptile Survey). 2015. Website. Available from http://www.paherpsurvey.org (accessed July 2015).

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Eastern Redbelly Turtle

McCoy, C. J. 1982. Amphibians and reptiles in Pennsylvania: checklist, bibliography, and atlas of distribution. Carnegie Museum of Natural History Special Publication 6, Pittsburgh, Pennsylvania.

PARS (Pennsylvania Amphibian and Reptile Survey). 2015. Website. Available from http://www.paherpsurvey.org (accessed July 2015).

Eastern Box Turtle

Kiester, A. R. and L. L. Willey. 2015. *Terrapene carolina* (Linnaeus 1758)-eastern box turtle, common box turtle. *In* A. G. J. Rhodin, P. C. H. Pritchard, P. P. van Dijk, R. A. Saumure, K. A. Buhlmann, J. B. Iverson, and R. A. Mittermeier, editors. Conservation Biology of Freshwater Turtles and Tortoises. Chelonian Research Monographs 5.

McCoy, C. J. 1982. Amphibians and reptiles in Pennsylvania: checklist, bibliography, and atlas of distribution. Carnegie Museum of Natural History Special Publication 6, Pittsburgh, Pennsylvania.

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Eastern Fence Lizard

McCoy, C. J. 1982. Amphibians and reptiles in Pennsylvania: checklist, bibliography, and atlas of distribution. Carnegie Museum of Natural History Special Publication 6, Pittsburgh, Pennsylvania.

PARS (Pennsylvania Amphibian and Reptile Survey). 2015. Website. Available from http://www.paherpsurvey.org (accessed July 2015).

Northern Coal Skink

McCoy, C. J. 1982. Amphibians and reptiles in Pennsylvania: checklist, bibliography, and atlas of distribution. Carnegie Museum of Natural History Special Publication 6, Pittsburgh, Pennsylvania.

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McCoy, C. J. 1982. Amphibians and reptiles in Pennsylvania: checklist, bibliography, and atlas of distribution. Carnegie Museum of Natural History Special Publication 6, Pittsburgh, Pennsylvania.

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Kirtland's Snake

McCoy, C. J. 1982. Amphibians and reptiles in Pennsylvania: checklist, bibliography, and atlas of distribution. Carnegie Museum of Natural History Special Publication 6, Pittsburgh, Pennsylvania.

PARS (Pennsylvania Amphibian and Reptile Survey). 2015. Website. Available from http://www.paherpsurvey.org (accessed July 2015).

Eastern Hognose Snake

McCoy, C. J. 1982. Amphibians and reptiles in Pennsylvania: checklist, bibliography, and atlas of distribution. Carnegie Museum of Natural History Special Publication 6, Pittsburgh, Pennsylvania.

PARS (Pennsylvania Amphibian and Reptile Survey). 2015. Website. Available from http://www.paherpsurvey.org (accessed July 2015).

Rough Green Snake

McCoy, C. J. 1982. Amphibians and reptiles in Pennsylvania: checklist, bibliography, and atlas of distribution. Carnegie Museum of Natural History Special Publication 6, Pittsburgh, Pennsylvania.

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Plummer, M. V. 1981. Habitat utilization, diet and movements of a temperate arboreal snake (*Opheodrys aestivus*). Journal of Herpetology **15**:425-432.

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Plummer, M. V. 1997. Population ecology of green snakes (*Opheodrys aestivus*) revisited. Herpetological Monographs **11**:102-123.

Queen Snake

McCoy, C. J. 1982. Amphibians and reptiles in Pennsylvania: checklist, bibliography, and atlas of distribution. Carnegie Museum of Natural History Special Publication 6, Pittsburgh, Pennsylvania.

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McCoy, C. J. 1982. Amphibians and reptiles in Pennsylvania: checklist, bibliography, and atlas of distribution. Carnegie Museum of Natural History Special Publication 6, Pittsburgh, Pennsylvania.

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Shorthead Garter Snake

McCoy, C. J. 1982. Amphibians and reptiles in Pennsylvania: checklist, bibliography, and atlas of distribution. Carnegie Museum of Natural History Special Publication 6, Pittsburgh, Pennsylvania.

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Eastern Smooth Earth Snake

McCoy, C. J. 1982. Amphibians and reptiles in Pennsylvania: checklist, bibliography, and atlas of distribution. Carnegie Museum of Natural History Special Publication 6, Pittsburgh, Pennsylvania.

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McCoy, C. J. 1982. Amphibians and reptiles in Pennsylvania: checklist, bibliography, and atlas of distribution. Carnegie Museum of Natural History Special Publication 6, Pittsburgh, Pennsylvania.

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McCoy, C. J. 1982. Amphibians and reptiles in Pennsylvania: checklist, bibliography, and atlas of distribution. Carnegie Museum of Natural History Special Publication 6, Pittsburgh, Pennsylvania.

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